A REVISION OF THE GENUS CISSAMPELOS

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INTRODUCTION

The genus Cissampelos is a member of the Family Menispermaceae, Tribe Cocculeae. It is difficult to find a genus within the Angiosperms so completely vegetatively heteromorphic as Cissampelos. Extremes are found in the diverse habit of the plants, in texture and form of leaves, degree of pubescence, and various types of inflorescences. Fortunately the flowers are uniform enough at the species level to delimit natural taxa.

The extreme reduction found in flowers of Cissampelos separates the group from related genera such as Antizoma and Stephania.

This revision is an extract from a dissertation submitted in partial fulfillment of the requirements for the degree of doctor of philosophy from Southern Illinois University and was under the direction of Dr. Robert H. Mohlenbrock. For the brevity of publication only a portion of the 200 page dissertation is presented. The complete dissertation is microfilmed and filed in the library of Southern Illinois University.

Material from the following herbaria was used for this study: Southern Illinois University (SIU), Gray Herbarium (GH), Missouri Botanical Garden (MO), U.S. National Museum (US), Chicago Natural History Museum (F), University of California at Los Angeles (LA), Stockholm (S), Berlin (B), the British Museum (BM), and the New York Botanical Garden (NY).

MORPHOLOGY

For the most part Cissampelos consists of subherbaceous or suffrutescent twiners. Only one species, C. ovalifolia DC., is a perennial upright herb.

The leaves within the genus are petiolate, and either basifixed or peltately inserted upon the lamina to the extent of 4 cm as in Cissampelos grandifolia Triana and Planch. This is quite a variable intraspecific character. A tendency exists for those species with a suborbicular leaf to be conspicuously peltate. The leaf shape is quite variable both within and between the species. The most prevalent leaf shape is cordate but the form can vary from deltoid to orbicular. The lamina ranges in size from 2-15 cm long and wide. The pubescence varies from glabrous to tomentose or sometimes sericeous. Color of the hairs ranges from brownish-red to brown, yellow, or white. The hairs are usually uniseriate and bicellular. The margin of the lamina varies from crenate to entire. The apex is most often obtuse. Broadly ovate or suborbicular leaf types will frequently be emarginate at the apex. All species of Cissampelos possess a mucronate apex. The base is usually cordate but may also be rounded, truncate, or retuse. The base is rarely attenuate. The texture is most often membranous or subcoriaceous, occasionally

chartaceous. Basifixed leaves tend to be palmately 5- to 7-nerved while those with the petiole inserted within the lamina usually are palmately 10- to 12-nerved. The veins are often prominent below. The lamina is usually dark above and pale below.

The petiole length varies from 0.5 to 18.0 cm, and may become swollen distally and proximally. It is frequently twisted proximally. The proximal and distal ends may also exhibit a denser pubscence than the remainder of the petiole. The pubescence of the petiole ranges from glabrous to tomentose.

The staminate inflorescence can be quite variable even within a species. Figure 1 illustrates the types of arrangements that can be found in the genus. Pathway A, B, C, D, E, and F indicates the reduction series which apparently occurs in the pantropic Cissampelos pareira L. Type A is a compound secondary branch with reduced leaves supporting many dichasia. Type B is a racemiform secondary branch with reduced leaves and axillary dichasia. Type C consists of a secondary branch, reduced leaves grading to reniform bracts with axillary dichasia, and the addition of dichasia at the base of the secondary branch. Type D is similar to Type C, but the secondary branch is much reduced. In Type E the secondary branch is absent and replaced by numerous dichasia axillary from a normal leaf. Type F is similar to Type E except the number of dichasia is reduced. Type F appears to represent the most advanced type of inflorescence. The C. pareira pathway may deviate to Type C1 which consists of a racemiform secondary branch with reniform bracts exclusively. C. grandifolia Triana and Planch. exhibits pathway A and A1. Type A1 is paniculiform but ebracteate. C. andromorpha DC. and C. fasciculata Benth. follow pathway A, B, C, C1, C2, and C3 or pathway A, A1, C2, and C3. Type C2 is a racemiform secondary branch but is ebracteate. Type C3 is the same as Type F but apparently originating from a different source. C. sympodialis Eichl. and C. glaberrima St. Hil. follow pathway C, C1, C2, and C3. C. tropaeolifolia DC. illustrates types A, B, C, C1, C2, and C3. C. laxiflora Moldenke is represented by Types C1 and C2. C. ovalifolia DC. follows pathway C1 directly to C3. The African and Asian species closely parallel the development found in the New World species. C. torulosa E. Mey., C. owariensis Beauv., and C. mucronata A. Rich. illustrate a trend from Type C through Types C1 and C2 to Type C3. C. rigidifolia (Engl.) Diels has inflorescence Types A and A1. C. nepalensis Rhodes exhibits Type C1 only, while C. nigrescens Diels and C. friesiorum Diels support Type F or C3.

The staminate flower consists of four sepals. Some specimens will have five sepals, but this is quite uncommon. The corolla varies from cupulate to patelliform. Rarely the corolla is deeply lobed or, it consists of free petals. The synandrium is sessile or stalked and the number of anthers is usually four but, in some species, such as Cissampelos mucronata, the number ranges from six to nine.

The pistillate inflorescence consists of individual flowers fasciculate on bracteate or ebracteate racemiform of paniculiform secondary branches.

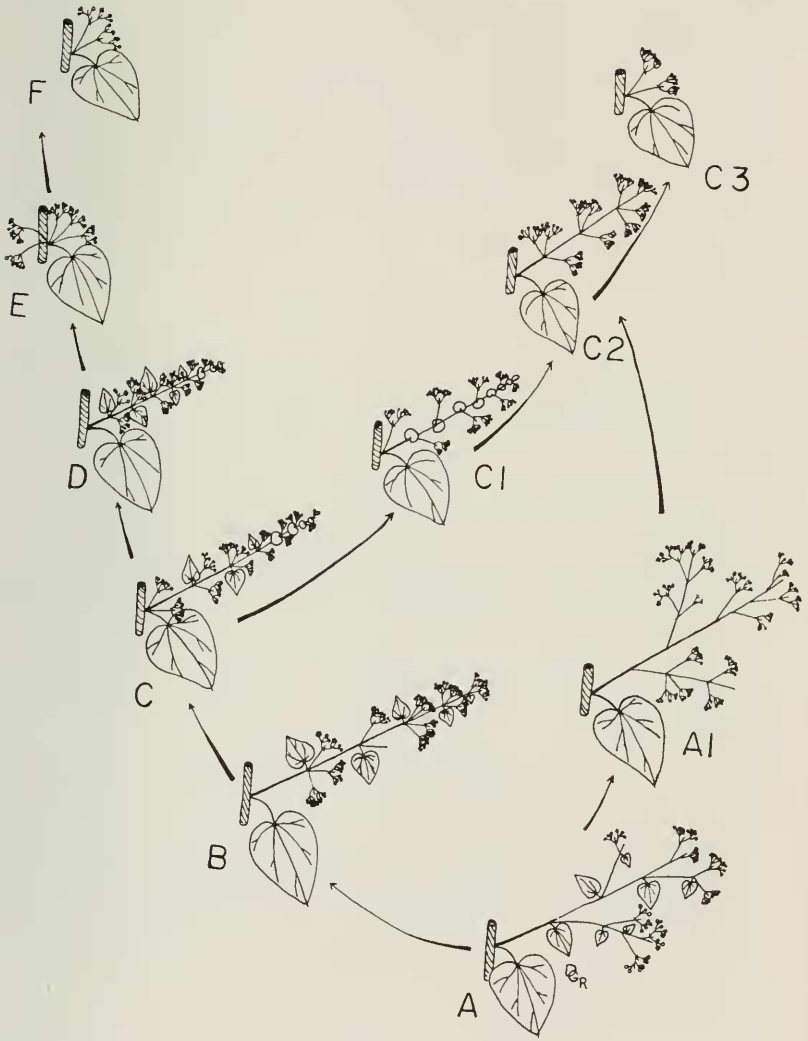


Figure 1. Inflorescence types of Cissampelos.

The pistillate flower consists of one sepal which is usually obovate, a single petal that is most often reniform, and a single gibbose carpel.

It is possible that the ancestral flowers of Cissampelos were bisexual, possessed several perianth appendages, nine or more free stamens, and three or more carpels. In the staminate flower the perianth appendages were reduced in number with four persisting to form a cupulate corolla. The patelliform type of corolla probably was derived from the cupulate form. The synandrium evidently was formed by the fusion of at least nine stamens. The number of anthers was then reduced, in most instances, to a minimum of four. The synandrial stalk progressively became shorter. The most advanced staminate flower possesses four sepals, a patelliform corolla, and a sessile synandrium of four anthers. In the pistillate flower reduction has occurred to a single sepal, petal, carpel, and ovule.

The fruit is an obovoid drupe which is usually red in color and pubescent.

SYSTEMATIC TREATMENT

Cissampelos L. Sp. Pl. 1031. 1753 (Type: C. pareira L.).
Dissopetalum Miers, in Ann. Nat. Hist. ser. 3. 17:267. 1866.

Twining shrubs, rarely erect. Leaves alternate, petiolate, more or less peltate or basifixed. Staminate inflorescence axillary, generally fasciculate, normally originating in a leafy axil as milti-flowered dichasia or the dichasia originating on axillary secondary branches in axils of reduced leaves or bracts. Staminate flowers 2-merous, actinomorphic: sepals 4, free, usually exteriorly pubescent; petals connately cupulate; stamens 4-9, monadelphous, the anthers sessile on a column formed by the connate filaments, dehiscence transverse. Pistillate flowers zygomorphic, fasciculate in the axils of reduced leaves or bracts upon secondary, frequently fasciculate, axillary branches: sepal 1, obovate, exteriorly pubescent usually; petal 1, antesepalous; carpel 1, free, gibbose, the style short, the stigma 3- to 5-lobed. Drupes subglobose, laterally compressed; endocarp osseous, verrucose, ribbed.

North and South America, Africa, and Asia.

In the species descriptions, mean character values are provided if more than ten specimens were available for study. The extremes for these species are presented in parentheses. Since many species of Cissampelos are quite heterogeneous, the characters of a typical specimen are often obscured by the extremes of variability presented in a conventional description. The mean values should afford more confidence in correct determination of the specimen most commonly collected.

Key to the Species

KEY TO THE SOUTH AMERICAN SPECIES

a. Erect perennial herbs. . . . . 1. C. ovalifolia
aa. Twiners or scramblers. . . . . b
b. At least some or all parts of plant with sericeous pubescence; leaves peltate to 35 mm. . . . . 2. C. tropaeolifolia
bb. Plants not sericeous or, if vegetative portions sericeous, then flowers puberulent or pilose, not sericeous; leaves seldom peltate to 35 mm c
c. Leaves strongly peltate, rarely basifixed. . . . . d
cc. Leaves basifixed or subpeltate to 1.5 cm or less. . . . . f
d. Glabrous throughout, rarely puberulent; leaves usually suborbicular, sometimes glaucous . . . . . 3. C. glaberrima
dd. Portion or all of plant pubescent; leaves usually ovate to deltoid, never glaucous . . . . . e
e. Leaves broadly ovate to suborbicular, 6-15 cm long; staminate and pistillate inflorescence ebracteate and paniculiform; staminate sepals 1.0-1.3 mm long; . . . . . 4. C. grandifolia
ee. Leaves usually deltoid, 2-6 mm long; staminate sepals 0.5-0.8 mm long; pistillate inflorescence bracteate, pistillate and staminate inflorescence never paniculiform . . . . . 5. C. sympodialis
f. Pistillate flowers verticillate, to 15 per node; pubescence appressed. . . 6. C. verticillata
ff. Pistillate flowers not verticillate, less than 10 per node; pubescence usually spreading. . . . . g
g. Flower and leaf completely glabrous; leaves dark and shiny; the apex acuminate, conspicously mucronate . . . . . .7. C. laxiflora
gg. Flower and leaf pubescent, rarely glabrous; leaves not dark and shiny, the apex acute to obtuse, rarely acuminate, not conspicously mucronate. . . . . h
h. Sepals of staminate flower usually not reflexed, glabrous to pilose, corolla cupulate and glabrous, synandrium to 0.9 mm long; petal of pistillate flower glabrous; inflorescence frequently fasciculate from old wood; leaves usually ovate to cordate . . . . . .8. C. andromorpha

hh. Sepals of staminate flower spreading, pilose to tomentose, corolla pilose and patelliform or rarely cupulate, synandrium usually sessile or essentially so; petal of pistillate flower pilose; inflorescence rarely from old wood; leaves usually cordate to suborbicular. i

i. Pistillate and staminate inflorescence paniculiform or racemiform, usually ebracteate or, if bracts present, frequently involute; leaves usually with short whitish pubescence, usually basifixed, generally over 10 cm. in length. . . . . 9. C. fasciculata

ii. Pistillate and staminate inflorescence rarely paniculiform, bracteate with the bracts rarely involute; leaves rarely with short, whitish pubescence, usually slightly peltate, generally less than 10 cm. in length . . . . . .10. C. pareira

KEY TO AFRICAN AND ASIAN SPECIES

a. Synandrium 6- to 9-locular; stigma 5-lobed. . . . . .11. C. mucronata

aa. Synandrium 4-, rarely 5- to 6-locular; stigma 3-lobed . . . . . b

b. Leaves conspicously peltate to 1.7 cm c

bb. Leaves basifixed or subpeltate to 4 mm. . . . . d

c. Glabrous; leaves never obscurely 3-lobed. . . . . 12. C. tenuipes

cc. All or some portion of plant pubescent; leaves frequently obscurely 3-lobed. . . . . 13. C. owariensis

d. Inflorescence paniculiform . . . . . .14. C. rigidifolia

dd. Inflorescence not paniculiform . . . . . e

e. Leaves frequently deltoid, base of nerves below with tuft of hairs; flowers glabrous; corolla of staminate flowers sometimes lobed or with free petals. . . . . 15. C. torulosa

ee. Leaves rarely deltoid, tuft of hairs absence from base of nerves below; flowers usually pubescent; corolla of staminate flower rarely lobed, never with free petals . . . . . f

f. Leaves usually ovate; corolla of staminate flowers cupulate . . . . . g

ff. Leaves usually cordate to suborbicular; corolla of staminate flowers patelliform, rarely cupulate . . . . . h

g. Plants puberulent; veins of leaves and sepals with phelloidal outgrowths; sepals of staminate flowers 0.6-0.8 mm long, corolla glabrous . . . . . 16. C. nepalensis

gg. Plants sericeous, especially the petioles; veins without phelloidal outgrowths; sepals of staminate flowers 1.1-1.4 mm long, corolla pilose. . . . . .17. C. friesorum
h. Inflorescence, flowers, and fruit glabrous. . . . . .18. C. hirta
hh. Inflorescence, flowers, and fruit pubescent i
i. Leaves frequently dark and shiny above; pubescence of short hairs; synandrium of staminate flowers about 0.5 mm long . . . . 19. C. nigrescens
ii. Leaves not dark and shiny above; pubescence typical; synandrium of staminate flowers usually sessile . . . . . .10. C. pareira

1. Cissampelos ovalifolia DC. Syst. 1:537. 1818 (Figure 2).

Cissampelos crenata DC. Syst. 1:537. 1818, ex char.

Cissampelos ovalifolia DC. B. cinerascens St. Hil. in Pl. Uteis Bras. t. 34, 1824.

Cissampelos obracteata St. Hil. in Pl. Uteis Bras. t. 35. 1824, ex char. (Type: St. Hilaire s.n.).

Cissampelos ovalifolia DC. a. cinereo-viridis St. Hil. in Fl. Bras. Merid. 1:51. 1825.

Cissampelos communis St. Hil. in Fl. Bras. Merid. 1:52. 1825, ex char. (Type: St. Hilaire s.n.).

Cissampelos velutina St. Hil. in Fl. Bras. Merid. 1:52. 1825 (Type: St. Hilaire s.n.).

Cissampelos subtriangularis St. Hil. in Fl. Bras. Merid. 1:52. 1825 (Type: St. Hilaire s.n.).

Cissampelos suborbicularis St. Hil. in Fl. Bras. Merid. 1:52. 1825 (Type: St. Hilaire s.n.).

Cissampelos assimilis Miers, in Kew Journ. Bot. 3:114. 1851.

Cissampelos amazonica Miers, in Kew Journ. Bot. 3:114. 1851. (Type: Spruce 353!).

Cissampelos vestita Triana & Planch. in Ann. Sc. Nat. 4, 17:44. 1862 (Type: Goudot s.n.).

Cissampelos rotundata Pohl ex. Engler, in Fl. Bras. 13, 1:186. 1864, nom. nud.

Cissampelos mallophylla Miers, in Ann. Nat. Hist. ser. 3. 17:169. 1866, ex char. (Type: Goudot s.n.)

Cissampelos ovalifolia DC. f. ovato-mucronata Chod. and Hassl. in Bull. Herb. Boiss. 2, 3:421. 1903 (Type: Hassler 5070).

Cissampelos ovalifolia DC. f. latifolia Chod. and Hassl. in Bull. Herb. Boiss. 2, 3:421. 1903 (Type: Hassler 4356!).

Cissampelos ovalifolia DC. f. reniformis Chod. and Hassl. in Bull. Herb. Boiss. 2, 3:421. 1903 (Type: Hassler 8038!).

Cissampelos ovalifolia DC. var. longepetiolata Chod. and Hassl. in Bull. Herb. Boiss. 2, 3:421. 1903 (Type: Hassler 4856).

Unbranched erect perennial herbs; stems striate, 1.3(-2) m high, tomentose. Leaves petiolate, basifixed, ovate to suborbicular, rarely elliptic, obovate, reniform or cordate, entire to undulate, the apex obtuse to rounded, rarely acute or emarginate, mucronate, the base cordate, truncate or rounded, rarely attenuate, (2-)5.6 (-10) cm long, (3-)4.3(-9) cm wide, subcoriaceous, palmately 5- to 7-nerved, glabrous to tomentose above, paler below and tomentose, rarely pilose, with the nerves usually prominent; petioles (0.5-) 0.8(-3.0) cm long, tomentose. Staminate inflorescence multi-flowered cymose dichasia in fascicles of 1-5 in the leaf axils; bracts minute or wanting; bracteoles linear, at length 0.5 mm long. Staminate flowers greenish-yellow: sepals 4, obovate, (1-)1.5(-2) mm long, (0.6-)0.9(-1.2) mm wide, exteriorly glabrous to pilose; corolla patelliform, (1.0-)0.9(-1.2) mm in diameter or cupuliform and 0.5 mm in height, 0.6-0.8 mm in diameter, glabrous; synandrium sessile to 0.5 mm high, anthers 4, glabrous. Pistillate inflorescence composed of 3-5 individual flowers fasciculate in the axils of bracts upon 1-2 secondary branches per leaf axil; bracts minute to large and foliaceous, basifixed, sessile or obscurely petiolate, ovate to suborbicular, mucronate, entire to undulate, 0.8(-1.6) cm long, 0.9(-1.9) cm wide, membranous, glabrous to tomentose above, pilose to tomentose below. Pistillate flowers: sepal 1, obovate, (1.4-)1.8(-2.0) mm long, (0.8-)1.0(-1.2) mm wide, the exterior glabrous to pilose; petal 1, subreniform, subquadrangular or broadly obovate, (0.5-)0.6(-0.7) mm long, (0.9-)1.0(-1.1) mm wide, glabrous; carpel 1, gibbose, (0.8-)1.0(-1.3) mm long, pilose. Drupe red or orange, obovoid, (6.0-)7.0(-8.5) mm long, (5.0-)5.6(-6.0) mm wide, pilose; peduncle 2 mm long.

South America.

BOLIVIA: Without Precise Locality: Cardenas 1921 (US,NY), Williams 519 (US,NY).

BRAZIL: CEARÁ: without precise locality, Gardner 1445 (NY). FEDERAL DISTRICT: Sobradinho, Irwin, Sousa and Santos 12120 (NY); Taguatinga, Irwin, Souza and Santos 10623 (NY); without precise locality, Irwin, Souza and Santos 8086 (NY). GOIÁS: Goiás, Macedo

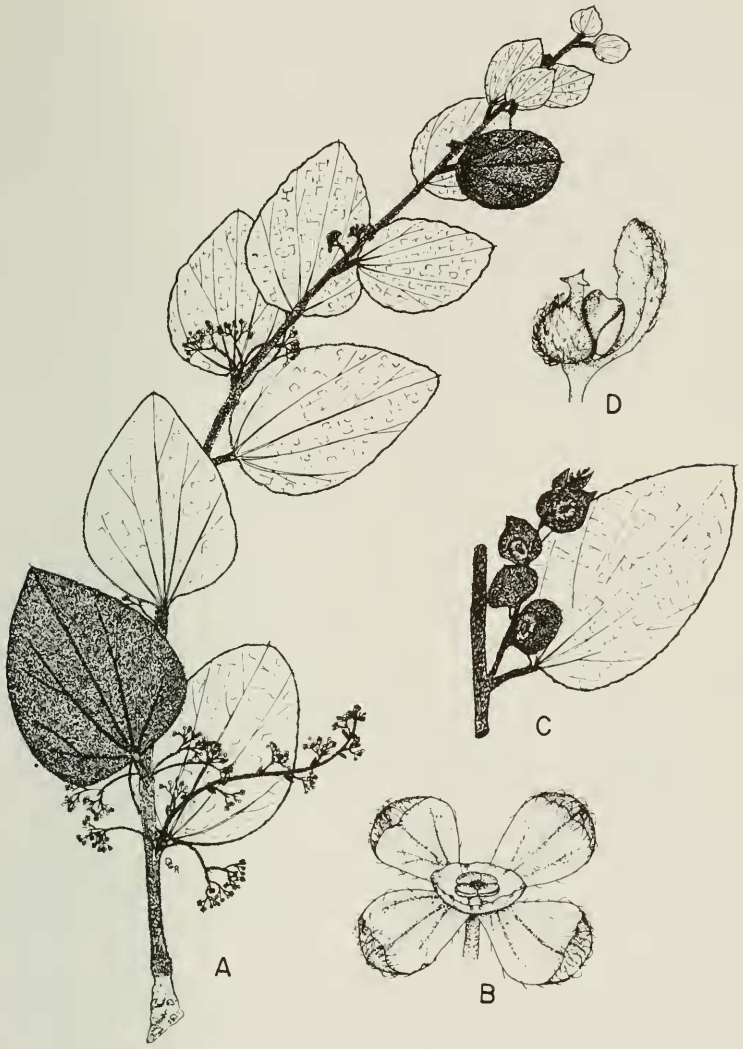


Figure 2. Cissampelos ovalifolia DC. A: Staminate plant, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescence and leaf, X 1/2; D: Pistillate flower, X 15.

3455 (US,NY); Cristalina, Irwin, Souza and Santos 9256 (NY); Planaltina, Irwin, Souza and Santos 9256 (NY). MATO GROSSO: Cuiabá, Malma 1132 (GH), Kuhlmann 243-K (NY); without precise locality, H. Smith 351 (NY). MINAS GERAIS: Belo Horizonte, Williams 5453 (GH), 6086 (GH), 5233 (GH), Barreto 6349 (F), 6353 (F), 9871 (NY), Sampaio 6406 (NY); Santa Luzia, Assis 38 (GH); Ituiutaba, L.B. Smith 4671 (US); Diamantina, Barreto 9871; Caldas, Regnell III-256 (US); Varzea do Palma, Duarte 7499 (NY); without precise locality, Regnell 296 (US), Cochran 29 (US), Macedo 581 (MO), Glaziou 18127 (NY), Claussen 66 (NY). PARÁ: Santarém, Spruce s.n. Froes 20458 (NY); Serra do Cachinbo, Pires, Black, Wurdack and Silva 6431 (NY); Alto de Cumina, Sampaio 5930a (NY). PARANÁ: Sao Bento, Schwacke 174 (NY); Jaquariaiva, Dusen 10612 (GH,MO); Lapa, Reitz and Klein 17.404 (MO), Hatschbach 6434 (US); Tibagí, Hatschbach 2841 (US); without precise locality, Dusen 7573 (F), 7512 (NY), 7155 (GH). PARAÍBA: Areia, Moraes 890 (US). PIAUI: without precise locality, Gardner 1445 (NY). SÃO PAULO: Campinas, J. and N. Mattos 8291 (US); São Paulo, Pickel 2411 (NY), Moldenke 19661 (NY); São José dos Campos, Mimura 55 (NY); without precise locality, Loefgren 12993 (NY). Without precise locality: Ule 380 (NY), Blanchet 3437 (NY).

BRITISH GUIANA: Takutu River and Kanuku Mountains, L.B. Smith 3229 (F,NY); without precise locality, Schomburgk 124 (F).

COLOMBIA: BOYACÁ: OROCUÉ, Haught 2649 (US,NY). VICHADA: Hermann 10971 (GH). Without Precise Locality: Haught 3952 (F,NY).

PARAQUAY: Without Precise Locality: Hassler 4356 (F), 9960 (NY)

SURINAM: Without Precise Locality: Jonker 511 (F,MO).

VENEZUELA: ARAGUA: without precise locality, Pittier 12138 (US). BOLÍVAR: Gran Sabana south of Mt. Roraima, Steyermark 59155 (F,NY); Santa Elena, Lasser 1342 (NY), Tamayo 2636 (F); La Gran Sabana, Pena 315 (US); without precise locality, Williams 11874 (US). CARABOBO: San Joaquín, Pittier 8037 (GH). LARA: between La Piedad and Sarare, José Saer 411 (F). MÉRIDA: Tovar, Fendler 1891 (GH). YARACUY: Urachiche, Steyermark 56850 (F).

Cissampelos ovalifolia DC. is the only species of the genus which is an upright perennial herb and consequently is quite distinctive.

Some authors (Saint Hilaire, 1825; Chodat and Hassler, 1903; Diels, 1910) maintained varieties for the species based primarily upon the degree of leaf pubescence. Intergradation, however, occurs to such an extent between the varieties that they appear taxonomicall impractical.

2. Cissampelos tropaeolifolia DC. Syst. 1:532. 1818 (Type: Dombey s.n.) (Figure 3).

Cissampelos fluminensis Eichl. in Menisperm. Am. Fl. 47:382. 1864 (Type: Martius s.n.).

Cissampelos sympodialis Eichl. var. grandifolia Britton, in Bull. Torr. Club 16:15. 1889 (Type: Rusby 1443!).

Cissampelos peltata Ruiz ex Diels, in Engl. Pflanzen. 4(94):299. 1910, nom. nud.

Cissampelos mucronata Poeppig ex Diels, in Engl. Pflanzen. 4(94):299. 1910, nom. nud.

Cissampelos tropaeolifolia DC. var. fluminensis (Eichl.) Diels, in Engl. Pflanzen. 4(94):300. 1910.

Cissampelos ciliata Rusby, in Mem. N.Y. Bot. Gard. 7:240. 1927 (Types: Bang 2074!, Cardenas 17972!, Rusby 811!).

Subherbaceous twiners to 10 m; stems straite, sericeous or sometimes glabrous, rarely pilose. Leaves petiolate, conspicously peltate to 35 mm, ovate to suborbicular or rarely cordate, entire to crenate, the apex acute to rounded, rarely caudate or acuminate, mucronate, the base truncate or rounded, rarely cordate, (3-)7.1(-15) cm long, (3-)6.1(-12) cm wide, membranous, palmately 9- to 12-nerved, usually prominent below, sericeous with long whitish hairs or glabrous, paler and occasionally glaucous below; petioles (2-)6(-16) cm long, glabrous to sericeous. Staminate inflorescence multi-flowered fasciculate dichasia in the leaf axils or upon secondary racemiform, rarely paniculiform, axillary branches to 23 cm within the axils of reduced leaves or bracts, the two forms frequently occurring together; 1-many dichasia per fascicle; peduncle of cymes at length 2 cm long, sericeous; bracts of secondary branches large, foliaceous, basifixed, sessile or petiolate to 2 mm, cordate to reniform, entire to undulate and frequently ciliate, mucronate, (2-)6.3(-16) mm long, (2-)7.7(-20) mm wide, membranous, sericeous, rarely glabrous or pilose; bracteoles linear, about 0.5 mm long, pilose. Staminate flowers whitish-green or cream: sepals 4, sometimes connate at base, elliptic to obovate, (1.0-)1.3(-2.4) mm long, (0.9-)1.1(-1.3) mm wide, glabrous or exteriorly sericeous; corolla patelliform, (0.7-)1.0(-1.4) mm in diameter or cupuliform and 0.4-0.8 mm in height, 1.0-1.3 mm in diameter, glabrous; synandrium sessile to 0.5 mm long, anthers 4, glabrous. Pistillate inflorescence composed of individual flowers fasciculate in the axils of bracts upon racemiform secondary bracteate axillary branches to 34 cm; bracts large and foliaceous, basifixed, sessile or petiolate to 5 mm, ovate to reniform, rarely suborbicular, entire to undulate and frequently ciliate, mucronate, (3-)14.3)(-25) mm long, (4-)17.9(-30) mm wide, membranous, sericeous, rarely glabrous or pilose. Pistillate flowers: sepal 1, ovate to obovate, (0.9-)1.2(-1.6) mm long, (0.7-)0.9(-1.1) mm wide, glabrous or rarely slightly sericeous exteriorly; petal 1, elliptic to suborbicular, (0.5-)0.6(-0.9) mm long, (0.5-)0.8(-1.1) mm wide, glabrous; carpel 1, gibbose, (0.6-)0.8(-1.0) mm long, sessile, glabrous, rarely sericeous or pilose, the stigma 3-lobed. Drupe red, obovoid, (4-)5.2(-6) mm long, (4-)4.7(-5) mm wide, sericeous, rarely glabrous; fruiting stalk (2-)3.3(-5) mm long.

Mexico, Central America, and northern South America.

MEXICO: CHIAPAS: Palenque, Matuda 3686 (F); Escuintla, Matuda 16542 (F); Corcega, Matuda 17892 (NY). GUERRERO: Atoyac, Matuda 1407 (F,MO). OAXACA: Tolosita, Williams 9638 (MO); Choapan, Mexia 9199 (F,MO); Ubero, Williams 9295 (F), 9308 (F) Tuxtepec, Martínez-Calderón 213 (GH), 242 (GH); Calea, Galeotti 4621 (US), 4625 (NY): Yaveo, Mexia 9230a (US), 9199 (NY); without precise locality, Conzatti 3802 (US). QUINTAMA ROO: Cozumel Island, vicinity of San Miquel de Cozumel, Lewis 6864 (NY). VERACRUZ: Coatzacoalcos River, Williams 9683 (F). Without Precise Locality: Liebmann 332 (US), 807 (US).

BRITISH HONDURAS: STANN CREEK: Middlesex, Schipp 352 (F,MO,NY). TOLEDO: without precise locality, Peck 602 (GH).

COSTA RICA: GUANACASTE: Buenos Aires, Tonduz 8535 (US). HEREDIA: Guapiles, León 698 (F). LIMON: Suretha, Dunlap 594 (F); Siquirres, Stork 2295 (F). SAN JOSE: El General, Skutch 3958 (GH,MO,NY), 2977 (US), 4944 (MO). Without Precise Locality: United Fruit Co. 185 (US).

EL SALVADOR: SAN SALVADOR: San Salvador, Carlson 322 (F).

GUATEMALA: ALTA VERAPAZ: Coban, Turckheim 1792 (NY); Panzos, Goll 233 (US). CHIQUIMULA: Chiquimula, Watson 11 (GH). HEUHUETENANGO: Ixcan, Steyermark 49437 (F). IZABAL: Izabal, Steyermark 39015 (F), 38698 (F); Puerto Harrios, Standley 72915 (F), 24858 (US), Steyermark 39312 (F). QUEZALTENANGO: between Santa María de Jesús and Calahuaché, Steyermark 33535 (F); between Finca Pirineos and Patsulín, Standley 86815 (F); Finca Pireneos, Standley 68424 (F); near Calahuaché, Steyermark 33316 (F), 33857 (F). RETALHULEU: Chivolandica, Standley 87212 (F). SACATEPEQUEZ: Finca Moca, Skutch 1573 (F), 1583 (F). SAN MARCOS: Río Cabús near Malacatán, Standley 68858 (F); Volcan Tajumulco, Steyermark 37234 (F).

HONDURAS: ATLANTIDA: La Ceiba, Yuncker, Koepper and Wagner 8289 (F).

NICARAGUA: CHINANDEGA: El Viejo, Shimek and Smith 484 (F).

PANAMA: BOCAS DEL TORO: Columbus Island, Wedel 23 (F,MO); Old Bank Island, Wedel 2083 (GH,MO), 1985 (GH,MO); 1888 (GH,MO), 1991 (GH,MO); Bocas del Toro, Wedel 383 (GH,MO); Chiriqui Lagoon, Wedel 1490 (GH,MO), 1853 (GH,MO), 1372 (GH,MO), 1035 (GH,MO), 381 (GH), 1376 (MO), 673 (GH,MO), 381 (MO), 382 (GH,MO), 1119 (GH,MO), 1819 (GH,MO), Seibert 1563 (US,MO); Isla de Colón, Wedel 46 (GH,MO), 2947 (GH,MO). CANAL ZONE: Barro Colorado Island, Shattuck 430 (F), Standley 41002 (US); Gatún, Stevens 1342 (US); Mount Hope Cemetery, Standley 28789 (US); mouth of R. Chagres, Allen 897 (MO); between Mt. Hope and Santa Rita Trail, Cowell 94 (NY). COLON: Catival, Standley 30345 (US). CHIRIQUI: Conception, Ebinger 760 (MO); between R. Tinta and R. Tabasará, Woodson, Seibert and Allen 414 (MO); Remedios, Woodson, Allen and Seibert 1187 (F,NY,MO); San Felix, Pittier 5458 (US,NY). DARIEN: Cana, Stern, Chambers, Dwyer, Ebinger 475 (MO), 638 (MO), Williams 778 (NY); Paca below Cana, Williams 767 (NY). PANAMA: R. Corso, Duke 12041 (NY). SAN BLAS: Achituppu, Lewis, Dwyer, Elias, Solís 129 (MO); Mandinga, Duke 8907 (MO).

BOLIVIA: BENI: Junction of Río Beni and Madre de Dios, Rusby 1443 (US,NY); Rurrenabaque, White 811 (US). COCHABAMBA: Without precise locality: Steinbach 6823 (GH). LA PAZ: Coroico to Río Yolasa, Mexia 7796 (F), 4275 (GH,MO); Coroico, Buchtein 758 (F,MO), 3683 (F,NY); Coripata, Bang 2074 (F,MO,NY).

BRAZIL: AMAZONAS: Maués, Pires 137 (NY); Tabatinga, Jobert-Schwacke 524 (NY); Humaita, Krukoff 6740 (F,NY); without precise locality, Schultes 7174 (US). MARANHÃO: Candido Mendes, Froes 1731 (GH). RIO GRANDE DO SUL: São Salvador, Leite 721 (NY).

COLOMBIA: ANTIOQUIA: Medellín, Toro 382 (NY), Archer 764 (US,NY); Cáceres, Daniel 2082 (US); Jardin, Daniel 2966 (US); Fredonia, Archer 521 (US); Copacabana, Daniel 747 (US); Dabeiba, Johnson and Barkley 18C674 (US). BOYACÁ: Mt. Chapon near Bogotá, Lawrence 49 (NY); without precise locality, Lawrence 249 (F,MO). CALDAS: Salamina, Tomas 1981 (US). CAUCA: La Gallera, Killip 7831 (NY); Coconuco to Popayan, Pennell 6904 (NY); Micay, Killip 7845 (GH,NY); without precise locality, André 2419 (F,NY). CHOCÓ: between Río Curiche and Alto Curiche, Duke 9606 (NY); Rio San Juan at junction of Río Condoto, Killip 35107 (US); Quibdó, Archer 1723 (US), 1737 (US); without precise locality, Molina and Barkley 19Ch062 (US). CUNDINAMARCA: without precise locality, Dugand and Jaramillo 3869 (US). META: Villavicencio, Pennell 1383 (GH), Schiefer 782 (US). SANTAMDER: Sarare, Cuatrecasas 13346 (F).

ECUADOR: GALAPAGOS ISLANDS: Academy Bay, Schimpff 32 (NY); Santa Cruz, Hagen 36 (NY); without precise locality, Andersson s.n. (NY). LOS RIOS: Vinces, Mexia 6599 (F), 6620 (US); Hacienda Clementina on Río Pita, Asplund 5586 (US,NY). MANABI: Jipijapa, Haught 3444 (US); Portoviejo, Rose and Rose 23435 (US). Without Precise Locality: Eggers 15468 (F).

PERU: AYACUCHO: Kimpitiriki, Killip and Smith 22391 (US). HUAÑUCO: Churubamba, Mexia 8192 (NY,MO), 8108 (MO); Huañuco, Mexia 8109 (F,NY); Puente Durand, Soelnik 1104 (US); near Huañuco, Stork and Horton 9593 (F); Tingo Maria, Woytkowski 5300 (F,MO). Allard 22407 (US), 22317 (NY), Asplund 12056 (US), Ferreyra 6810 (US). JUNÍN: Mercedes, Killip and Smith 23443 (F,NY), Mexia 8192 (F,GH). LORETO: Gamitanacocha, Río Mazán, Schunke 327 (F,NY); San Antonio, Killip and Smith 29497 (F,NY); Iquitos, Río Itaya, Killip and Smith 29384 (F), Williams 3374 (F), 3400 (F); Mishuyacu near Iquitos, Klug 773 (F,NY); Caballococha, Williams 2405 (F); Sanango, Ferreyra 4911 (US); Pumayacu near Balsapuerto, Klug 3230 (F,NY), MacBride 5059 (F); lower Río Huallaga, Williams 3936 (F). SAN MARTIN: Pasaraya to Saposoa, Woytkowski 5068 (MO); San Roque, Williams 7456 (F). Without Precise Locality: MacBride 4594 (F), Isern 2416 (F).

VENEZUELA: BOLÍVAR: Río Nichare, Steyermark and Gibson 95708 (NY).

Cissampelos tropaeolifolia DC. resembles C. grandifolia Triana & Planch., C. pareira L., and C. glaberrima St. Hil., in rare instances but overall is morphologically distinct. The most distinguishing characters include the ovate leaf which is peltate, the

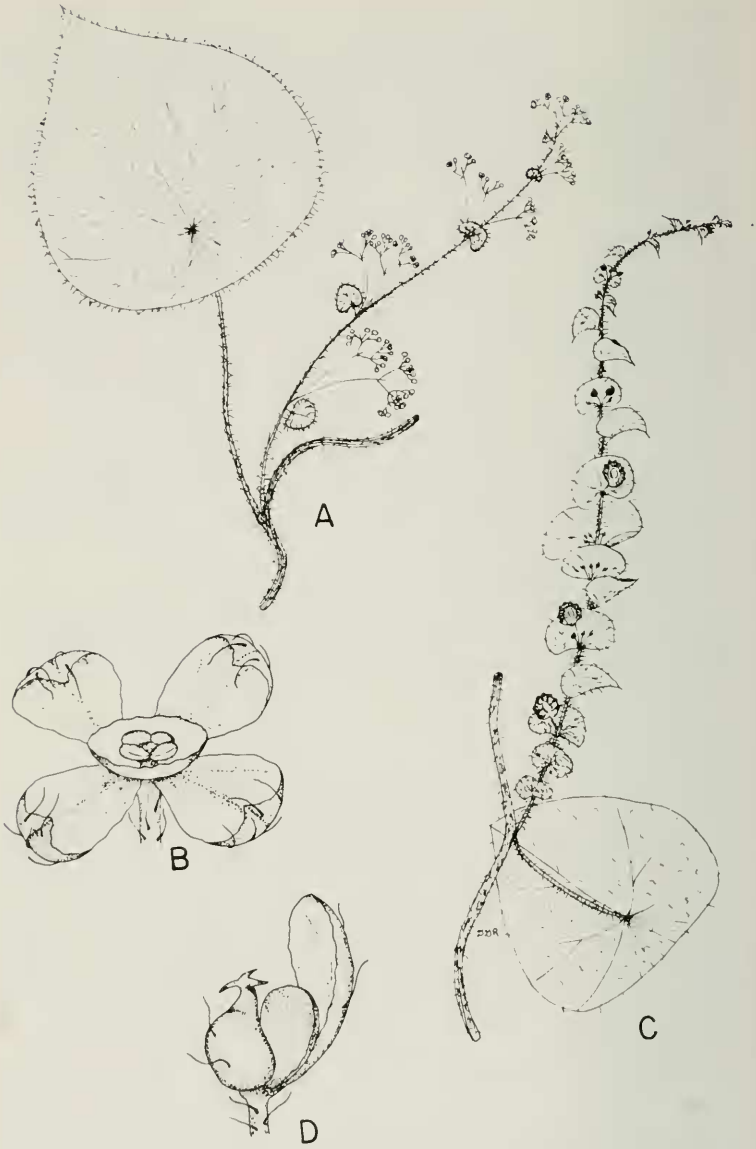


Figure 3. Cissampelos tropaeolifolia DC. A: Staminate inflorescence and leaf, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescence and leaf, X 1/2:, D: Pistillate flower, X 15.

large and foliaceous bracts, and sericeous pubescence.

The plant is known locally in Guatemala as "alcotan" or "aspirino", in Mexico as "curarina", and Bolivia as "quitis utar manti".

The species is often found as a twiner in dense forests or thickets but on occasion as a twiner on shrubs in open areas.

3. Cissampelos glaberrima St. Hil. in Fl. Bras. Merid. 1:46. 1825 (Figure 4).

Cissampelos parreira Vell. Fl. Flum. 10. t. 138. 1827, ex char.

Cissampelos clematidea Presl, Botan. Bemerk. 7. 1844, ex char.

Cissampelos errabunda Miers, in Ann. Nat. Hist. er. 3. 17:138. 1866 (Type: Swainson s.n.).

Cissampelos glaberrima St. Hil. var. orbicularis Chod. and Hassl. in Bull. Herb. Boiss. 2, 3:421. 1903 (Types: Hassler 4749!, 4787!).

Cissampelos galapagensis Stewart, in Proc. Calif. Acad. Sci. ser. 4. 1:66. 1911 (Type: Stewart 1519!).

Twiners to 3 m; stems striate, glabrous or essentially so. Leaves petiolate, conspicuously peltate to 20 mm, broadly ovate to suborbicular, entire to crenate, the apex acute to rounded, mucronate, the base truncate to rounded, (2.5-)4.6(-7.5) cm long, (2.5-)4.6(-7.0) cm wide, membranous, palmately 5- to 12-nerved, conspicuous below, glabrous, dark green above, silvery and sometimes glaucous below; petioles (2.5-)5.0(-6.0) cm long, glabrous or rarely pilose. Staminate inflorescence multi-flowered fasciculate dichasia arranged in an ebracteate racemiform manner to 10 cm in length or as cymose clusters axillary from normal leaves or rarely cymose clusters within the axils of reduced leaves or bracts of secondary axillary branches; 1-2 dichasia per fascicle; peduncle of cymes at length 2 cm long, glabrous or rarely pilose; bracts of secondary branches large and foliaceous, basifixed, petiolate to 8 mm, broadly ovate to cordate, entire to undulate, to 13 mm long and 15 mm wide, membranous, glabrous; bracteoles linear, about 0.5 mm long, glabrous. Staminate flowers white or greenish: sepals 4, elliptic to obovate, (1.0-)1.4(-1.7) mm long, (0.7-)0.8(-0.9) mm wide, glabrous or essentially so; corolla cupuliform, (0.5-)0.8(-0.9) mm high, (0.5-)0.8(-1.0) mm in diameter, or rarely patelliform, 1.0 mm in diameter, glabrous; synandrium sessile to 0.8 mm high, anthers 4, glabrous. Pistillate inflorescence composed of individual flowers fasciculate in the axils of bracts upon racemiform secondary bracteate axillary branches to 15 cm; 1-2 flowers per fascicle; bracts large and foliaceous, often silvery and terminally grouped, basifixed, sessile or petiolate to 10 mm, reniform, rarely cordate or broadly ovate, entire to undulate, mucronate, (3-)10.4(-18) mm long, (3-)12.5(-21)

mm wide, membranous, glabrous. Pistillate flowers: sepal 1, slliptic to obovate, (1.4-)1.6(-1.8) mm long, (0.8-)0.9(-1.0) mm wide, glabrous; petal 1, reniform to deltoid, (0.6-)0.7(-0.8) mm long, (0.8-)0.9(-1.0) mm wide, glabrous; carpel 1, slightly gibbose, (0.8-)1.0(-1.1) mm long, sessile, glabrous, stigma 3-lobed. Drupe red, obovoid, (4-)4.3(-5) mm long, (3-)3.5(-4) mm wide, glabrous, rarely puberlent, sometimes glaucous; fruiting stalk 3-4 mm long.

Central America and South America.

COSTA RICA: SAN JOSÉ: El General, Skutch 4944 (NY).

GUATEMALA: HUEHUETENANGO: San Isidro, Krukoff 112 (NY).

BRAZIL: CEARÁ: Guaramiranga, Cutler 8307 (GH,MO); without precise locality, Gardner 1444 (GH), Guedes 485 (NY). GOIÁS: Corumba de Goiás, Irwin, Souza and Santos 10798 (NY), 10965 (NY). MARANHÃO: Maracassumé River, Froes 1731 (NY). MATO GROSSO: São Luiz de Cáceres, Hoehne 1049 (NY); without precise locality, Moore 555 (NY). MINA GERAIS: Ribeirão, Sampaio 6954 (NY); Belo Horizonte, Barreto 6347 (F), Williams 5292 (GH), 5656 (MO); Santa Luzia, Assis 223 (GH); Lagoa Santa, Hoehne 6217 (NY); Vicosa, Kuhlmann 2117 (NY), Mexia 4152 (GH,MO,NY); Pocos de Caldas, Regnell 257 (US); without precise locality, Sampaio 436 (NY). PERNAMBUCO: Tapera, Pickel 875 (GH,NY), 184 (GH). RIO DE JANEIRO: Parahiba do Sul, Diogo 82 (NY). SAU PAULO: Rio Preto, Diels 4517 (NY), Campinas, Santoro 848 (US), 860 (US), Novaes 1004 (US). Without Precise Locality: De Moura 42 (US), Maceda 595 (US), Miers 4222 (US).

COLOMBIA: ATLANTICO: Barranquilla, Elias 1470 (GH). EL CAUCA: San Antonio, Pennel and Killip 7338 (NY).

ECUADOR: GALÁPAGOS ISLANDS: Indefatigable Island, Academy Bay, Svenson 3 (F), Howell 9038 (GH), Stewart 1519 (US,MO).

PARAGUAY: ALTO PARANÁ: without precise locality, Fiebrig 6341 (US). CAAGUAZÚ: Igatimí, Hassler 4787 (F), 4749 (GH). CENTRAL: Villa Elisa, Pedersen 4208 (US). CORDILLERA: Altos, Fiebrig 643 (F), Hassler 3492 (GH,NY). SAN PEDRO: without precise locality, Woolston 1151 (US,NY), 312 (NY). Without Precise Locality: Hassler 10269 (NY), 1269 (NY).

PERU: LORETO: Iquitos, Killip and Smith 29384 (NY).

VENEZUELA: BOLÍVAR: Upata, Steyermark 57710 (F).

The distinguishing features of this species are suborbicular leaves which are frequently glaucous and have an overall glabrous condition. Some specimens of Cissampelos tropaiolifolia DC. approach C. glaberrima St. Hil., but the former can be distinguished by a degree of sericeous pubescence and a patelliform corolla. At least one collection resembles C. laxifolia Mold. in that it possesses a shiny ovate leaf with an acuminate apex, but the floral structure is typically that of C. glaberrima.

The species is normally found trailing over shrubs or rocks in open areas or at edges of thickets. It is also found as a twiner in woodlands.

In Brazil the plant is known as "orelha de onca".

Specimens from the Galapagos Islands differ from mainland forms in that the corolla tends to be patelliform instead of the typical

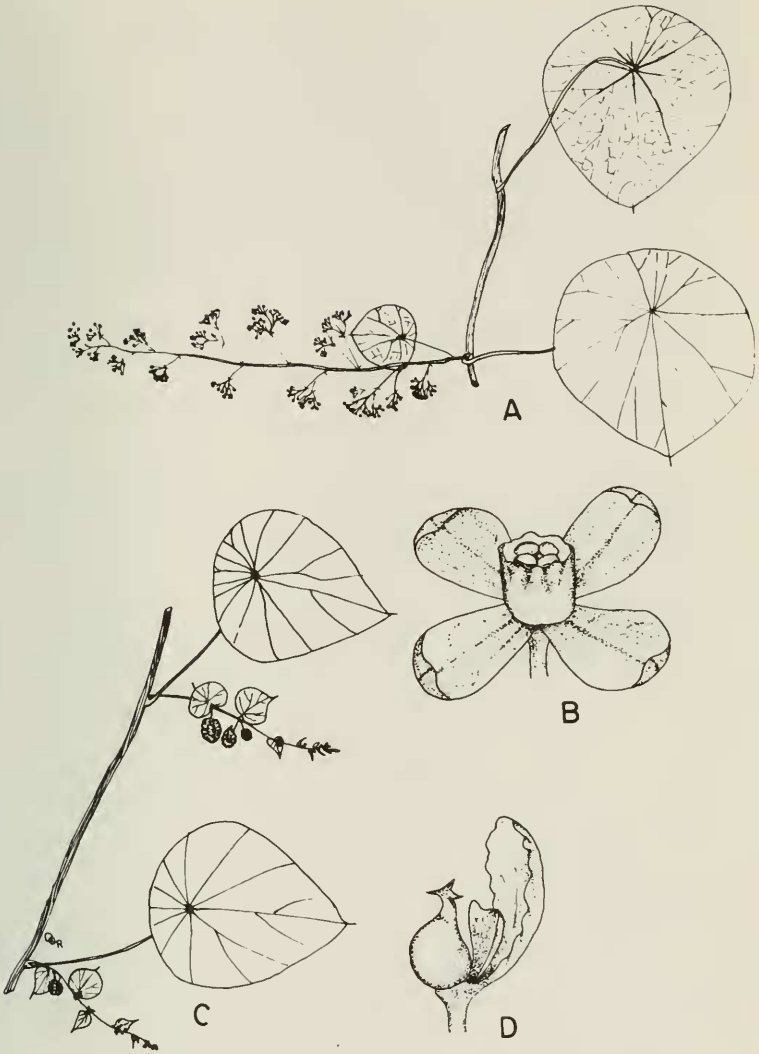


Figure 4. Cissampelos glaberrima St. Hil. A: Staminate inflorescence and leaves, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescences and leaves, X 1/2; D: Pistillate flower, X 15.

cupulate type. Considering all features of the species, however, this character alone is not sufficient for species delimitation. Stewart (1911) in his description of these specimens as Cissampelos galapagensis did not consider the corolla form in his justification but mentioned that male flowers are in cymes, thus differing from C. glaberrima where panicles exist. A racemiform type of inflorescence does exist on mainland individuals but also axillary cymes occur. Orbicular-rhombic sepals, according to Stewart, delimits material of the Galapagos Islands from the lanceolate sepals of the mainland C. glaberrima but orbicular-rhombic sepals do occur on the latter individuals. For reasons stated, C. glaberrima is retained as the valid name by priority and C. galapagensis is considered as a synonym.

4. Cissampelos grandifolia Triana and Planch. in Ann. Sc. Nat. ser. 4. 17:44. 1862 (Type: Triana s.n.) (Figure 5).

Cissampelos acuta Triana and Planch. in Ann. Sc. Nat. ser. 4. 17:43. 1862. (Type: Triana 4695).

Woody twiners to 5 m; stems striate, puberulent to pilose. Leaves petiolate, conspicously peltate to 40 mm, broadly ovate to suborbicular, entire to undulate, the apex acute to obtuse, rarely acuminate or rounded, mucronate, the base truncate to rounded or rarely cordate, (6-)10.2(-15) cm long, (4-)10.1(-15) cm wide, membranous, palmately 9- to 12-nerved, frequently prominent below, glabrous to pilose above, paler and puberulent to densely pilose below; petioles (4-)11.6(-18) cm long, puberulent to tomentose, sometimes tomentose only distally and proximally. Staminate inflorescence multi-flowered fasciculate dichasia arranged in frequently branched ebracteate panicles to 35 cm, frequently terminal; 1-4 dichasia per fascicle; peduncle of cymes at length 2 cm long. Staminate flowers: sepals 4, sometimes connate at the base, obovate, (1.0-)1.1(-1.3) mm long, (0.6-)0.8(-1.0) mm wide, pilose exteriorly; corolla patelliform, (0.6-)0.9(-1.1) mm in diameter, glabrous or essentially so; synandrium (0.1-)0.3(-0.5) mm in height, anthers 4, glabrous. Pistillate inflorescence composed of 2-8 individual flowers fasciculate upon frequently branched ebracteate, rarely bracteate, panicles to 25 cm long. Pistillate flowers: sepal 1, elliptic to obovate, (1.0-)1.5(-2.0) mm long, (0.7-)0.8(-1.8) mm wide, the exterior pilose; petal 1, deltoid or reniform, (0.5-)0.6 (-0.8) mm long, (0.7-)0.8(-1.0) mm wide, exteriorly puberulent; carpel 1, gibbose, (0.8-)0.9(-1.1) mm long, pilose to tomentose. Drupe red, obovoid, (4-)4.3(-6) mm long, (4-)4.2(-5) mm wide, puberulent to pilose; fruiting stalk 2-3 mm long.

Central and South America, Mexico, and West Indies.

COSTA RICA: GUANACASTE: Talamanca Mountains, Tonduz 11404 (US, NY), 9617 (US), 12980 (US), 8663 (US). SAN JOSÉ: El General, Skutch 2696 (GH,MO,NY), 2833 (GH,MO,NY).

HONDURAS: ATLÁNTIDA: San Alejo, Standley 7706 (F); Tela, Standley 52748 (F), 10506 (NY), 53726 (F), Bangham 222 (GH);

Lancetilla, Yuncker 4521 (F,MO); bank of Rio Esperanza near Elvirs Plantation, Wilson 403 (NY).

MEXICO: CHIAPAS: Ecuintla, Matuda 1800 (MO).

PANAMA: BOCAS DEL TORO: Rio Teribe between Quebrada Huron and Quebrada Schlunjik, Kirkbride and Duke 482 (MO). DARIÉN: Cana, Stern, Chambers, Dwyer, Ebinger 475 A (MO).

PORTO RICO: ARECIBO: Arecibo, Heller 332 (NY).

COLOMBIA: BOYACÁ: northwest of Bogotá, Lawrance 226 (F,MO,NY). CALDAS: Salento, Pennell 9387 (NY); Santa Cecilia, Sneidern 5154 (US); Tabeja, Pennell, Killip and Hazen 8603 (US,NY). CAUCA: San Antonio, Pennell 7634 (NY); Popayan, Sneidern 4822 (US,NY); Carpinterías, Arbeláez and Cuatrecasas 6154 (US). CUNDINAHARCA: San Bernardo, Durand and Jaramillo 3975 (US); Santana, Durand and Jaramillo 3884 (US); Tequendama, Killip 34038 (US), Cuatrecasas 97 (US). HUILA: La Plata, Sneidern 2266 (GH,NY). NARIHO: Umbría Klug 1908 (F,NY,MO). TOLIMA: El Eden to La Plamilla, Killip and Hazen 9626 (NY); Mariguita, Cuatrecasas 9404 (US); Quindío Highway, Killip and Varela 35657 (US). Without Precise Locality: Sneidern 4588 (US), Dryander 2816 (US).

ECUADOR: LOS RIOS: Vinces, Mexia 6599 (NY). NAPO-PASTAZA: Zatzayacu, Mexia 7091 (US); Archidona, Mexia 7248 (US); Tena, Asplund 8864 (US), 9159 (NY). SARTIAGO ZAMORA: Zamora to Yanzasa, Mathias and Taylor 5243 (LA), 5233 (LA), 5222 (LA), 5248 (LA), 5213 (LA), 5247 (LA); near Zamora, Mathias and Taylor 5212 (LA). Without Precise Locality: Schimpff 982 (GH,MO).

PERU: HUÁNUCO: vicinity of Tingo María, Mathias and Taylor 4052 (LA), 5320 (LA), Zavortink 3019 (LA), 3011 (LA), 3020 (LA), 3022 (LA), 3048 (LA), 3001 (LA), 3025 (LA), 3023 (LA). LORETO: Leticia, Williams 3051 (GH); Balsapuerto, Klug 2911 (GH,MO,NY). SAN MARTÍN: Fundo Consuelo, 181 km. from Pucallpa on Tingo María road, Zavortink 3045 (LA). Without Precise Locality: Tessmann 4981 (NY).

VENEZUELA: MERIDA: Jají, Steyermark 55963 (GH,NY).

Cissampelos grandifolia Triana and Planch., known as "bejuco amargos" in Venezuela, is a climber most frequently found in dense forests or at the edge of thickets. The species is easily distinguished by the large broadly ovate to suborbicular peltate leaves, the large paniculate inflorescence, and small, densely pubescent flowers.

Triana and Planchon (1892) described Cissampelos acuta and C. grandifolia in the same work. However, the species are synonymous. Traditionally the species should be called C. acuta as this description precedes that of C. grandifolia by one page. However, since C. grandifolia is so well established within the literature and no precise ruling exists in the rules of nomenclature in respect to page order, it appears taxonomically practical to retain C. grandifolia as the valid name.

5. Cissampelos sympodialis Eichl. in Flora 47:392. 1864 (Type: Gardner 1234!) (Figure 6).

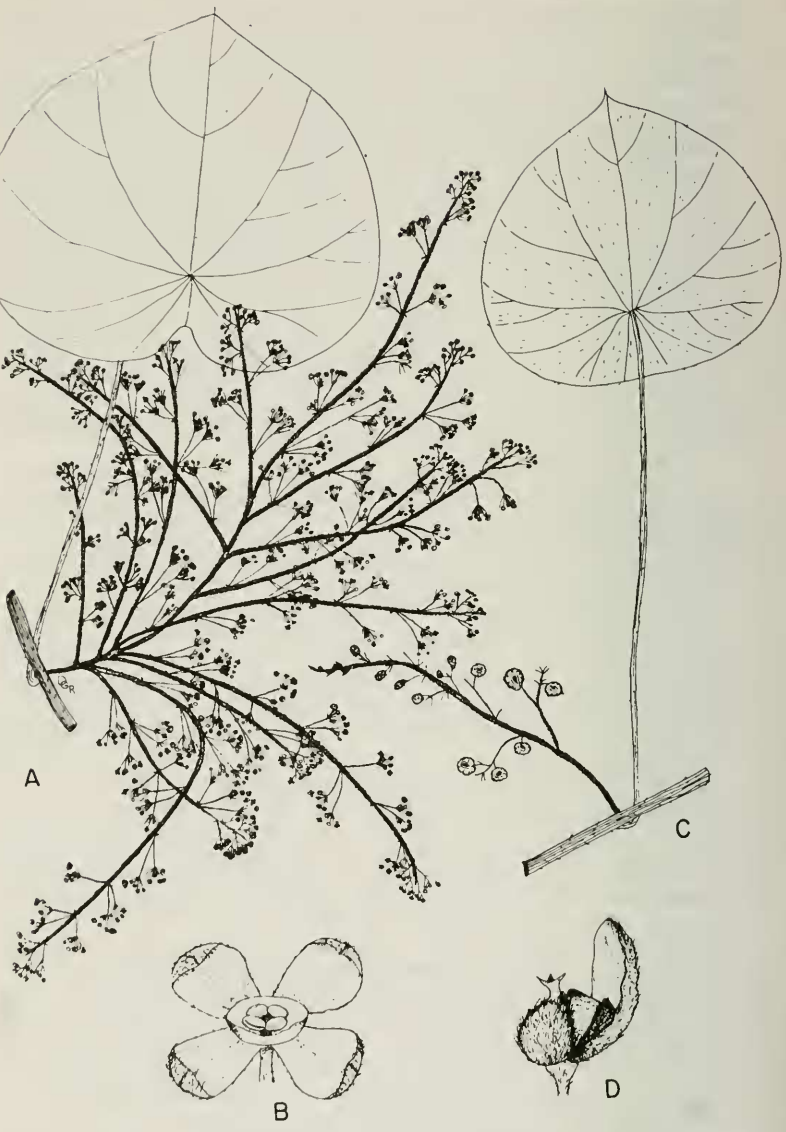


Figure 5. Cissampelos grandifolia Triana and Planch. A: Staminate inflorescence and leaf, X ⅓; B: Staminate flower, X 15; C: Pistillate inflorescence and leaf, X ⅓; D: Pistillate flower, X 15.

Twiners; stems striate, glabrous to tomentose. Leaves petiolate, peltate to 20 mm, ovate to deltoid, entire to undulate, the apex acute to obtuse, rarely emarginate, mucronate, the base truncate to rounded, rarely cordate, 2.2-6.1 cm long, 1.4-6.0 cm wide, membranous to subcoriaceous, palmately 5- to 12-nerved, prominent below, glabrous, rarely puberulent; petioles 0.8-4.5 cm long, glabrous to densely pilose. Staminate inflorescence multi-flowered fasciculate dichasia arranged in an ebracteate racemiform manner to 12 cm in length or as cymose clusters axillary from normal leaves or within axils of reduced leaves or bracts of secondary axillary branches; 1-3 dichasia per fascicle; peduncle of cymes at length 1 cm long, pilose; bracts, when present, ovate, basifixed, petiolate to 2 mm, ovate, mucronate, entire, 5 mm long and wide, pilose; bracteoles about 1 mm long. Staminate flowers greenish; sepals 4-5, obovate to elliptic, 0.5-0.8 mm long, 0.5-0.6 mm wide, exteriorly pilose, the interior glabrous; corolla patelliform, 0.8 mm in diameter, glabrous; synandrium to 0.2 mm high, anthers 4-5, glabrous. Pistillate inflorescence composed of 3-6 individual flowers fasciculate on bracteate racemiform secondary axillary branches; bracts basifixed, petiolate to 5 mm, ovate to cordate, entire, mucronate, 5-15 mm long, 4-12 mm wide, sometimes grading to minute, membranous, glabrous to pilose. Pistillate flowers: sepal 1, obovate, 0.8 mm long, 0.7-0.8 mm wide, exteriorly pilose, the interior glabrous; petal 1, reniform, 0.4-0.5 mm long, 0.7-0.8 mm wide, glabrous; carpel 1, gibbose, 0.5 mm long, glabrous. Drupe pyriform, 5 mm long, 4 mm wide, glabrous; fruiting stalk 1 mm long.

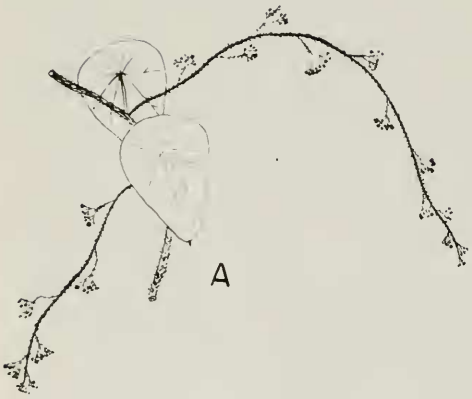
South America.

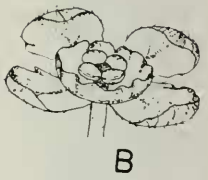
BRAZIL: ALAGOAS: without precise locality, Gardner 1234 (GH). CEARA: Fortaleza, Ducke 2570 (NY); Sierra de Maranguape, Ducke 2587 (NY), 2513 (NY); Sierra de Aratanha, Ducke 2393 (NY); without precise locality, Allemao s.n. (NY). MINAS GERAIS: Pocos de Caldas, Regnell 298 (US). Without Precise Locality: Glaziou 10236 (US).

Cissampelos sympodialis Eichl. is an uncommon species of Brazil, characterized by small, glabrous, strongly peltate, ovate or deltoid leaves.

6. Cissampelos verticillata Rhodes, sp. nov. (Type: Triana s.n.!) (Figure 7).

Plantae volubiles; caules straiti, caules juvenes pilosi usque tomentosi pilis appressis. Folia petiolata, basifixa vel obscure peltata, cordata usque suborbiculata, integra, apex acutus usque rotundatus, mucronatus, basis truncata usque cordata, saepe retusa, 5.3-10.5 cm longa, 5.5-9.0 cm lata, membranacea usque subcoriacea, palmatim 7-9 nervata, infra prominentia, supra glabra usque puberula, infra pallidiora et dense pilosa usque tomentosa pilis appressis; petioli 3.0-7.0 cm longi, tomentosi. Inflorescentia staminata et flores ignoti. Inflorescentia pistillata floribus 5-15, verticillatis in ramis racemosis vel paniculatis bracteatis secundariis axillaribus usque 20 cm, ramis 1-3 per axillam folii, vel flores verticillati in





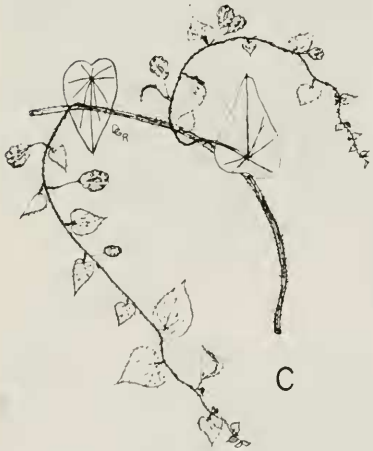


Figure 6. Cissampelos sympodialis Eichl. A: Staminate inflorescences and leaves, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescences and leaves, X 1/2; D: Pistillate flower, X 15.

axillis foliorum reductorum ramorum secundariorum axillarium; bracteae basifixae, petiolatae usque 3 mm, reniformes usque obcordatae, integrae, mucronatae, 5-10 mm longae, 4-6 mm latae, membranaceae, pilosae supra, dense pilosae usque tomentosae infra. Flores pistillati: sepalum 1, obovatum, 1.0 mm longum, 0.7 mm latum, extus dense pilosum; petalum 1, quadrangulatum, 0.5 mm longum, 0.5 mm latum, extus pilosum; carpellum 1, parum gibbosum, 0.7 mm longum, dense pilosum. Drupa obovoidea, 3-4 mm longa, 3-5 mm lata, pilosa; pedicellus fructifer 5-7 mm longus.

South America.

COLOMBIA: CUNDINAMARCA: without precise locality, Gutierrez 130 (GH). VALLE DEL CAUCA: Cisneros, Killip 35544 (US); Cordillera Central, Río Palo, Cuatrecasas 19474 (GH). Without Precise Locality: Triana s.n. (US).

Cissampelos verticillata Rhodes is a species from Colombia distinguished by the pistillate inflorescence which consists of clusters of 5-15 flowers arranged in a verticillate manner.

7. Cissampelos laxiflora Moldenke, in Phytologia, 2:215. 1947 (Type: Pires and Black 949!) (Figure 8).

Twiners; stems striate, puberulant to glabrous. Leaves petiolate, peltate to 6 mm or basifixed, cordate to reniform or broadly ovate, entire to undulate, the apex acuminate to rounded, conspicuously mucronate, the base truncate to retuse, 2.5-12.0 cm long, 3.5-10.5 cm wide, chartaceous, palmately 5- to 9-nerved, the nerves conspicuous, glabrous or essentially so, dark and shiny above in drying; petioles 2-8 cm long, puberulent. Staminate inflorescence multi-flowered fasciculate dichasia arranged in a bracteate or ebracteate racimiform manner to 12 cm in length; 1-4 dichasia per fascicle; peduncle of cymes at length 1.5 cm, puberulent to appressed pilose; bracts small, basifixed, petiolate to 2 mm, broadly ovate, entire, 4 mm long, 4 mm wide, grading to minute, puberulent. Staminate flowers yellowish-green: sepals 4, elliptic, 0.9 mm long and wide, glabrous; corolla patelliform, rarely cupulate, 0.8 mm in diameter, glabrous; synandrium to 0.5 mm high, anthers 4-6. Pistillate inflorescence composed of 1-6 individual flowers fasciculate in the axils of bracts upon racemiform axillary branches to 18 cm long or on paniculate terminal branches; bracts foliaceous, petiolate to 2 mm, reniform to suborbicular, entire, conspicuously mucronate, 4-8 mm long, 5-10 mm wide, glabrous or puberulent. Pistillate flowers pedicellate to 4 mm: sepal 1, obovate, 1.6 mm long, 0.8 mm wide, exteriorly pilose, the interior glabrous; petal 1, reniform to suborbicular, 0.6 mm long, 1.0 mm wide, glabrous; carpel 1, gibbose, 0.6-1.0 mm long, pilose to glabrous. Drupe pyriform, 4-6 mm long, 4-5 mm wide, puberulent; fruiting stalk 3-5 mm long.

South America.

BRAZIL: AMAZONAS: São Paulo de Olivenca, Krukoff 9038 (NY). Froés 20737 (NY); Tabatinga, Pires and Black 939 (NY), 947 (NY), 949 (NY), 1072 (NY); Tefé, Pires 1377 (NY); Camatian, Froés 23992

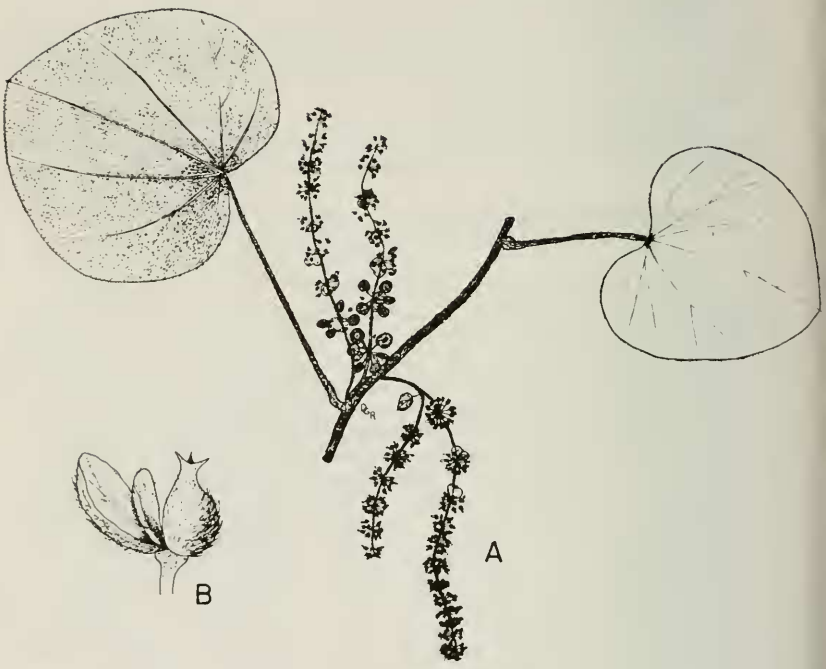


Figure 7 . Cissampelos verticillata Rhoces. A: Pistillate inflorescences and leaves, X ½; B: Pistillate flower, X 15.

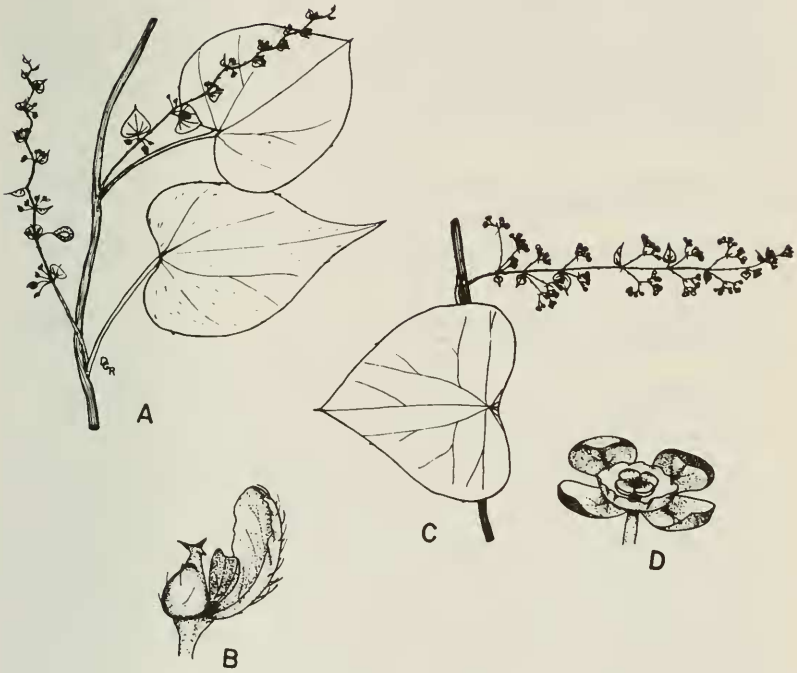


Figure 8 . Cissampelos laxiflora Moldenke. A: Pistillate inflorescences and leaves, X ½; B: Pistillate flower, X 15; C: Staminate inflorescence and leaf, X ½; D: Staminate flower, X 15.

(NY). Without Precise Locality: Leite 2099 (GH).

COLOMBIA: CALDAS: Santa Cecilia, Sneidern 5152 (NY,US). META: Villavicencio, Pennell 1562 (NY,GH). VALLE DEL CAUCA: Río Calima, La Trojita, Cuatrecasas 16510 (NY).

ECUADOR: SANTIAGO-ZAMORA: Zamora to Yanzasa, Mathias and Taylor 5259 (LA), 5244 (LA).

PARAGUAY: GUAIRÁ: Villarrica, Jorgensen 4254 (US,MO,NY).

PERU: LORETO: Río Putumayo at mouth of Río Zubineta, Klug 2322 (F,US,NY,MO); Florída, Klug 2029 (F,MO); Pumayacu, Klug 3230 (F,MO); Requena, Vigo 6254 (LA).

URUGUAY: CERRO LARGO: without precise locality, Rosenguett B1717 (GH).

A species very close morphologically to Cissampelos andromorpha DC., but differing in the more shiny, acuminately tipped leaves which bear conspicuous mucros, the smaller flowers, and in the inflorescences which do not occur in a fasciculate manner from the old wood.

8. Cissampelos andromorpha DC. Syst. 1:539. 1818 (Type: Patris s.n.) (Figure 9).

Cissampelos caapeba Vell. Fl. Flum. 10. tab. 139. 1827, non L. (1753).

Cissampelos denudata Miers, in Kew Journ. Bot. 3:115. 1851 (Type: Miers 4522).

Cissampelos ramiflora Miers, in Contrib. Bot. 3:163. 1871 (Type: Spruce 3165!).

Shrubby twiners to 7 m; stems striate, young glabrous to pilose, rarely sericeous. Leaves petiolate, basifixed or peltate to 10 mm, ovate to cordate, rarely reniform to suborbicular, entire to undulate, the apex acuminate to obtuse, rarely rounded or caudate, sometimes emarginate, mucronate, the base cordate to truncate, rarely attenuate or rounded, (3-)7.0(-12) cm long, (3-)6.5 (-11) cm wide, membranous to subcoriaceous, palmately 5- to 12-nerved, prominent below, glabrous to pilose above, rarely sericeous, paler below and puberulent to densely pilose, rarely glabrous or sericeous; petioles twisted and swollen proximally, (2-)5.7(-10) cm long, glabrous to tomentose. Staminate inflorescence multi-flowered fasciculate dichasia arranged normally in an ebracteate paniculiform or racemiform manner to 26 cm in length, frequently from old wood, or as cymose clusters axillary from normal leaves or rarely cymose clusters within the axils of reduces leaves or bracts of secondary axillary branches; 1-6 dichasia per fascicle; peduncle of cymes at length 3 cm long, puberulent to pilose; bracts of secondary branches basifixed, sessile or petiolate to 5 mm, ovate or rarely cordate to reniform, mucronate, entire and sometimes involute, 5-13 mm long, 4-13 mm wide, membranous to subcoriaceous, pilose, rarely puberulent or tomentose; bracteoles about 1 mm long, pilose. Staminate flowers

greenish, white or yellow: sepals 4, obovate to elliptic, (0.9-) 1.3(-2.0) mm long, (0.5-)0.9(-1.3) mm wide, exteriorly glabrous to pilose; corolla cupuliform, rarely patelliform or lobed, (0.3-) 0.6(-1.0) mm in height, (0.5-)1.0(-1.5) mm in diameter, glabrous or rarely puberulent exteriorly; synandrium sessile to 0.9 mm long, anthers 4, glabrous. Pistillate inflorescence composed of 4-10 individual flowers fasciculate on ebracteate, rarely bracteate, racemiform or paniculiform secondary branches; bracts of secondary branches basifixed, sessile or petiolate to 3 mm, ovate to suborbicular, entire and sometimes involute, mucronate, 2-8 mm long, 2-9 mm wide, membranous to subcoriaceous, glabrous to tomentose. Pistillate flowers: sepal 1, obovate to elliptic, (1.0)1.5(-1.8) mm long, (0.6-)0.9(-1.2) mm wide, exteriorly pilose; petal 1, obovate to reniform, (0.6-)0.9(-1.1) mm long, (0.5-)1.0(-1.7) mm wide, glabrous or rarely puberulent exteriorly; carpel 1, gibbose, (0.6-) 0.8(-1.0) mm long, glabrous to tomentose. Drupe red, obovoid, (3-)4.9(-7) mm long, (3-)4.2(-5) mm wide, glabrous to pilose; fruiting stalk (2-)4.7(-17) mm long.

Central and South America.

COSTA RICA: SAN JOSE: El General, Skutch 4944 (F,MO); Without Precise Locality: Eggers 824 (GH), Imary 207 (GH).

GUATEMAL: ALTA VERAPAZ: Cobán, Standley 69244 (F).

PANAMÁ: PANAMÁ: Cerro Azul, Duke 8907 (NY).

BOLIVIA: LA PAZ: Copacahana, Krukoff 11142 (F,MO,NY); near Mapiri on left bank of Rio Mapiri, Krukoff 10764 (F,MO,NY); San Carlos near Mapiri, Buchtein 1769 (US); without precise locality, Bang 1553 (F,MO,NY), Williams 583 (NY).

BRAZIL: AMAZONAS: São Paulo de Olivanca, Froes 20575 (NY); Humaitá, Krukoff 6521 (F), 6690 (US,MO,NY), 6740 (US,MO), 7274 (NY); Nazareth, Rio Negro, Schultes and Lopez 9241 (US); Nassau, Lanjouw and Linderman 2347 (NY); Guaporé, Porto Velho, Silva 413 (NY); Maués, Pires 139 (NY); Rio Icana, Cachoeira Macarico, Froes 28022 (NY); without precise locality, Froes 21053. BAHIA: Bela Vista, Froes 12695/60 (GH). CEARÁ: Baturite, Ule 9035 (US). MARANHÃO: Island São Luis, Krukoff 11764 (NY). MINAS GERAIS: Minas Gerais, Krukoff 1629 (NY); Belo Horizonte, Barreto 9933 (F); Vicosa, Mexia 4410 (GH,MO,NY), 5281 (F,US,MO,NY), 4174 (NY), Irwin 2679 (F), 2050 (NY). PARÁ: Arredores de Belém, Froes 20771 (NY); Belém, Pires and Black 346 (NY), 439 (NY), Archer 7777 (NY); Maraba, Froes and Black 24664 (NY). PARANÁ: Dusen 17324 (F,NY), 7041 (F), 13420 (GH), 15772 (US,MO), 7009 (NY), 6997 (US,MO); Paranaguá, Hatschbach 2020 (US). RIO DE JANEIRO: Rio de Janeiro: Glaziou 18129a (F), Duarte 45715 (NY). RIO GRANDE DO SUL: Cucador on road to Taquara, Smith and Reitz 9095 (US,NY), 5545 (NY); Cascata, Lindman 885 (GH). SANTA CATARINA: San Francisco do Sul, Reitz and Klein 6293 (NY); Lajes, Smith and Klein 5545 (US), 6293 (US); Ibirama, Klein 944 (US); Brusque, Rodriguez C1895; Itajaí, Rodriguez C1489 (GH); Tijucas, Ule 4226 (NY). SÃO PAULO: São Paulo, Goncalves 29918 (NY); Butantan, Hoehne 1061 (NY); Campinas, Novaes 1005 (US). Without Precise Locality: Foeppig 2743 (F), Burchell 8863 (GH,NY), Irwin 2679 (NY), Reitz and Klein 3900 (NY).

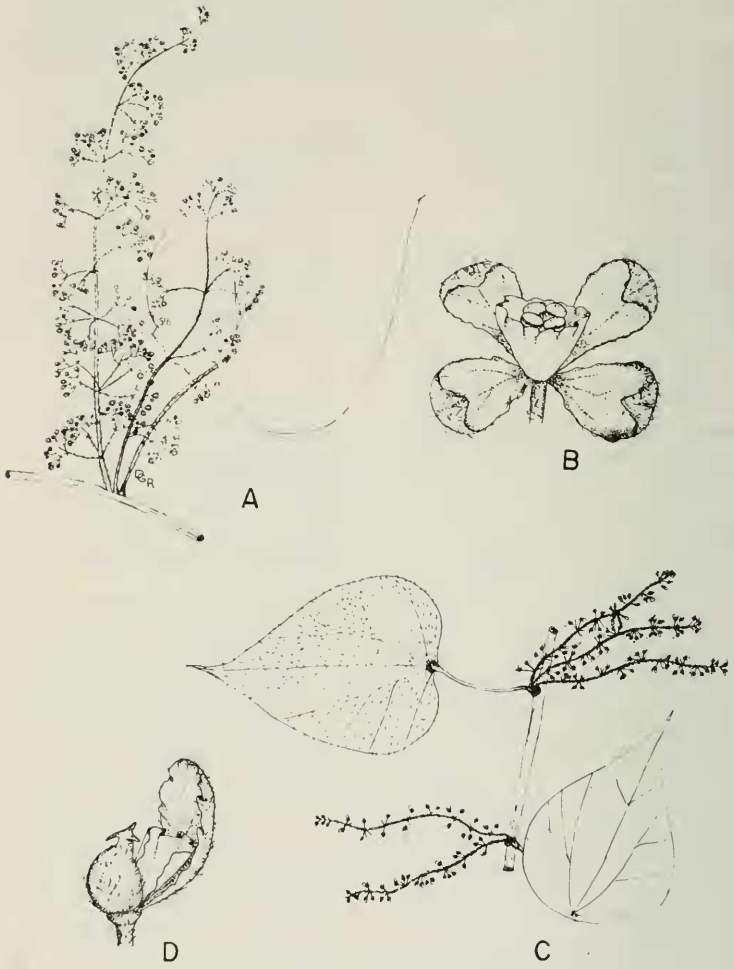


Figure 9. Cissampelos andromorpha DC. A: Staminate inflorescences and leaf, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescences and leaves, X 1/2; D: Pistillate flower, X 15.

BRITISH GUIANA: Pomeroon District, Moruke River, De La Cruz 4562 (F,MO,NY); Rockstone, Gleason 840 (GH,NY); Issorora, Aruka River, Hitchcock 17576 (US,NY); Northwest District, Mabaruma Compound, Archer 2301 (US); without precise location, Fanshawe 4802 (US).

COLOMBIA: AMAZONAS: Rio Hamacayacu between Amazon and Putumayo watersheds, Schultes 8244 (US). BOYACÁ: Bogotá, Lawrance 667 (F, MO); Mt. Chapon, Lawrance 425 (F,MO,NY). CAQUETÁ: Cordillera Oriental, Cuatrecasas 9130 (F); Florencia, Cuatrecasas 8798 (F). CAUCA: Popayán, Cuatrecasas 13853 (F). CHOCÓ: Tutunendo near Quibeó, Archer 2139 (US,NY); La Concepción near Quibdó, Archer 2212 (US); without precise location, Fernández 265 (US). META: Villavicencio, Cuatrecasas 4507 (US), 4681 (US). PUTUMAYO: Umbría, Klug 1656 (F). TOLIMA: El Eden to La Palmilla, Killip and Hazen 9626 (GH). VALLE DEL CAUCA: La Trojita, Cuatrecasas 16510 (F), 16235 (F,NY). VAUPES: San Joaquín, Fernández 2017 (US).

ECUADOR: LOS RÍOS: Vinces, Mexia 6621 (GH). NAPO-PASTAZA: Tena, Mexia 7146 (US,NY). SANTIAGO-ZAMORA: Zamora to Yanzasa, Mathias and Taylor 5258 (LA).

PERU: HUÁNUCO: Rondos, Vigo 5886 (LA); Tingo María, Woytkowski 5329 (F,MO), 5397 (US,MO); Zavortink 3024 (LA), Vigo 6183 (LA). LORETO: Punchana, Dodson 2840 (MO); middle Ucayali, Tessmann 3183 (NY); Aquaytia, Woytkowski 5344 (F,MO); Balsapuerto, Klug 2893 (F, NY,MO); Mishuyaca near Iquitos, Klug 967 (F,NY), 1498 (F,NY), 981 (US), 1008 (US,F,NY); Leticia, Williams 3094 (F); Iquitos, Tessmann 5067 (NY), Williams 8098 (F); lower Río Nanay, Williams 405 (F), 518 (US); Caballo-cocha, Williams 2085 (F); Río Napo near Mazán, Mexia 6463a (GH); San Juan near Iquitos, Asplund 14403 (US). Without Precise Locality: Poppig 29rb (F).

SURINAM: Coppename Creek, Lanjouw and Ooststroom 465 (US); east-west road at Morico Creek, Kramar and Hekking 3166 (NY); Nassau, Lanjouw and Lindeman 2347 (NY).

VENEZUELA: AMAZONAS: Solano, Williams 14784 (F); San Carlos, Williams 14528 (F,NY), Schultes and Lopez 9377 (US,NY). BOLÍVAR: west of La Laja along Río Karuai, Steyermark 60765 (GH,NY); Gran Sabana, Tamayo 2976 (US); Santa Klena de Uairén, Lasser 1647 (NY).

Cissampelos andromorpha is known locally in Peru as "macotilla", in Venequela as "macumi", and in Brazil as "jorro-jorro". The species is distinguished by the yellowish staminate flowers with sepals usually not reflexed, cupulate corolla, and stalked synandrium. The frequently ebracteate pistillate and staminate inflorescences are often fasciculate from old wood.

9. Cissampelos fasciculata Benth. in Lond. Journ. Bot. 2:361. 1843 (Types: Schomburgk 677, 221) (Figure 10).

Cissampelos scutigera Triana and Planch. in Ann. Sc. Nat. ser. 4. 17:42. 1862, ex char. (Type: Triana 4695).

Cissampelos andromorpha Eichl. in Fl. Bras. 13. 1:195. 1864, non DC. (1818).

Cissampelos floribunda Miers, in Ann. Nat. Hist. ser. 3. 17:135. 1866 (Type: Poppig 2916).

Cissampelos coriacea Standl. in Field Mus. Pub. Bot. 18:437. 1937 (Type: Brenes 6720!).

Suffrutescent twiners to 15 m from thick, deep-set rhizomes; stem striate, pilose to tomentose, rarely glabrous. Leaves petiolate, basifixed or peltate to 10 mm, rarely to 23 mm, cordate, rarely ovate or suborbicular, entire to undulate, the apex acuminate to obtuse, rarely emarginate, mucronate, the base cordate to truncate, (6-)11.0(-16) cm long, (6-)10.8(-16) cm wide, membranous to subcoriaceous, palmately 7- to 9- nerved, rarely 12-nerved, glabrous to pilose above, paler below and pilose to tomentose, frequently with whitish hairs; petioles (4-)6.8(-11) cm long, pilose to tomentose, sometimes tomentose only distally and proximally. Staminate inflorescence multi-flowered fasciculate dichasia arranged in a bracteate or ebracteate racemiform or paniculiform manner to 20 cm in length or as cymose clusters axillary from normal leaves or rarely cymose clusters within axils of reduced leaves or bracts of secondary axillary branches to 34 cm in length; 2-6 dichasia per fascicle; peduncle of cymes at length 3 cm long, tomentose; bracts basifixed, petiolate to 6 mm, ovate to cordate, entire and frequently involute, 2.5-4.0 mm long, 1.8-5.0 mm wide, membranous, pilose to tomentose; bracteoles linear, about 1 mm long, tomentose. Staminate flowers white or greenish: sepals 4, elliptic to obovate, (0.6-)1.0(-1.4) mm long, (0.5-)0.7(-0.9) mm wide, exteriorly pilose to tomentose, often with short whitish hairs; corolla patelliform, (0.7-)0.9(-1.1) mm in diameter, the exterior pilose; synandrium sessile or essentially so, anthers 4, glabrous. Pistillate inflorescence composed of 4-6 individual flowers fasciculate or bracteate racemiform or paniculiform secondary branches, 1-3 branches per leaf axil or sometimes terminal; bracts basifixed, sessile or petiolate to 3 mm, ovate to cordate, entire and frequently involute, (4-)7.7(-18) mm long, (4-)6.7(-13) mm wide, membranous to coriaceous, tomentose. Pistillate flowers: sepal 1, obovate, (1.0-)1.3(-1.6)mm long, (0.7-)0.8(-0.9) mm wide, exteriorly pilose to tomentose; petal 1, deltoid, obovate, suborbicular or quadrangular, (0.6-)0.8(-1.0) mm long and wide, pilose exteriorly; carpel 1, gibbose, (0.7-)1.0(-1.3) mm long, tomentose or rarely pilose. Drupe orange or red, obovoid, (4.5-)4.7(-5.0) mm long, (4.0-)4.2(-4.5) mm wide, pilose; fruiting stalk (1-)1.5(-2) mm long.

Mexico, Central and South America.

MEXICO: VERACRUZ: Orizaba, Nelson 183 (US). YUCATAN: Tuxpeña, Campeche, Lundell 973 (NY).

COSTA RICA: ALAJUELA: Atenas, Smith P2488 (NY); San Antonio de Zarcero, Smith 313 (US), A105 (F), H270 (F), H271 (MO); San Carlos,

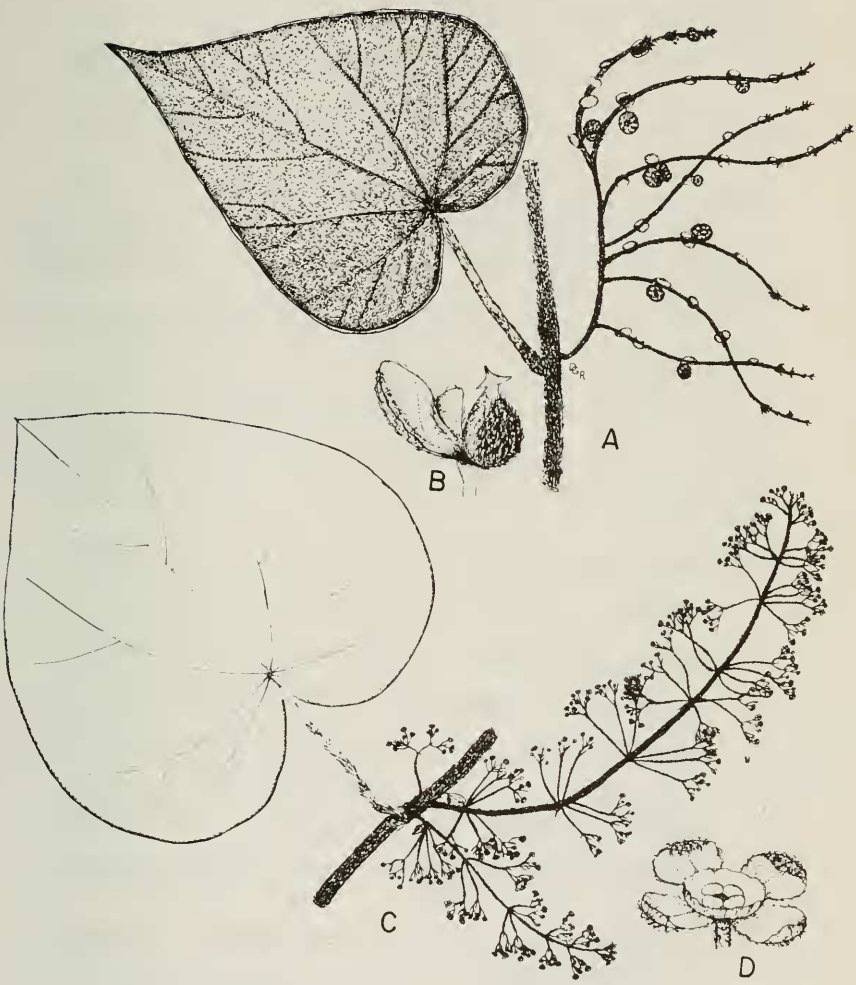


Figure 10. Cissampelos fasciculata Benth. A: Pistillate inflorescences and leaf, X 1/2; B: Pistillate flower, X 15; C: Staminate inflorescences and leaf, X 1/2; D: Staminate flower, X 15.

Smith F1857 (F, MO,NY); San Luis de Turcero, Smith NY1368 (F,NY); San Ramón, Brenes 6720 (F), 6126 (F), Echeverria 4125 (F); Bruissons, Tonduz 11.403 (US). SAN JOSÉ: Cóncavas, Laukeke 333 (F); Vara Blanca de Sarapiquí, Skutch 3400 (GH), 3642 (NY); San Pedro, Godfrey 67217 (MO).

GUATEMALA: SUCHITEPEQUEZ: Volcán Santa Clara, Steyermark 46679 (F).

PANAMÁ: BOCAS DEL TORO: Shepherd Island, Von Wedel 2691 (GH). CHIRIQUÍ: Boquete, Dwyer and Hayden 7624 (MO). PANAMÁ: El Llano, Duke 5659 (MO).

BRAZIL: AMAZONAS: Madeira River, Rusby 1442 (NY). MINAS GERAIS: Ituiutaba, Macedo 1178 (NY).

COLOMBIA: CAUCA: Cuatro Esquinas, Pennell and Killip 6320 (NY). EL VALLE: Miraflores, Killip 6118 (NY). HUILA: Pitalito, Fosberg 20050 (NY,US), 19997 (NY). NARIÑO: Umbría, Klug 1666 (F,NY,MO). SANTANDER: Las Vegas, Killip and Smith 16106 (NY).

ECUADOR: LOS RÍOS: Babahoyo, Schimpff 313 (MO). NAPO-PASTAZA: Oriente, Gill 20a (NY). PICHINCHA: between Volcán Atacaso and Volcán Pichincha, Steyermark 52551 (US). SANTIAGO-ZAMORA: between Campanas and Arenillas, Steyermark 53566 (NY).

A species sometimes confused with Cissampelos andromorpha DC. but differing in the larger and more densely pubescent leaves, the patelliform corolla and sessile synandrium of the staminate flower, and the presence of the staminate or pistillate inflorescence on recent growth.

10. Cissampelos pareira L. Spec. Pl. 1031. 1753 (Figure 11).

Cissampelos pareira L. a. Spec. Pl. 1031. 1753.

Cissampelos caapeba L. Spec. Pl. 1032. 1753, ex char.

Menispermum orbiculatum L. Spec. Pl. 341. 1753, ex char.

Cissampelos cocculus Poir. in Lam. Encycl. 5:9. 1804, ex char.

Cissampelos convolvulacea Willd. Spec. Pl. 4:863. 1805 (Type: Klein s.n.).

Cissampelos mauritiana Thou. in Desv. Journ. Bot. 2:65 tab. 3 and 4. 1809.

Cissampelos heterophylla DC. Syst. 1:534. 1818 (Type: Thibaud s.n.).

Cissampelos orbiculata DC. Syst. 1:537. 1818.

Cissampelos microcarpa DC. Syst. 1:537. 1818 (Type: Swartz s.n.).

Cissampelos hirsuta Buch. ex. DC. Syst. 1:535. 1818, ex char. (Type: Buchanan s.n.).

Cissampelos discolor DC. Syst. 1:534. 1818 (Type: Lambert s.n.).

Cissampelos tomentosa DC. Syst. 1:535. 1818.

Cocculus orbiculatus DC. Syst. 1:523. 1818 (Type: Rheede s.n.).

Cissampelos tamoides Willd. ex. DC. Syst. 1:536. 1818.

Cissampelos argentea HBK. Nov. Gen. & Sp. 5:67. 1821, ex char. (Type: Humboldt and Bonpland 1508).

Cissampelos guayaquilensis HBK. Nov. Gen. & Sp. 5:67. 1821, ex char. (Type: Humboldt and Bonpland 3847).

Cissampelos orinocensis HBK. Nov. Gen. & Sp. 5:68. 1821.

Cissampelos gracilis St. Hil. Fl. Bras. Mer. 1:56. 1825, ex char. (Type: St. Hilaire s.n.).

Cissampelos monoica St. Hil. Fl. Bras. Mer. 1:55, 1825 (Type: St. Hilaire s.n.).

Cissampelos australis St. Hil. Fl. Bras. Mer. 1:54. 1825.

Cissampelos litoralis St. Hil. Fl. Bras. Mer. 1:54. 1825.

Cissampelos obtecta Wall. Cat. 4981. 1827. (Type: Wallich 4979).

Cissampelos hernandiifolia Wall. Cat. 4979 partim. 1828.

Cocculus villosus Wall. Cat. 4957 partim. 1828, ex char.

Cissampelos caapeba Roxb. Fl. Ind. 3:842. 1832, ex char.

Cissampelos tetrandra Roxb. Fl. Ind. 3:842. 1832, ex char. (Type: Roxburgh s.n.).

Cissampelos haenkeana Presl. Reliqu. Haenk. 2:80. 1836.

Cissampelos hirsutissima Presl, Reliqu. Haenk. 2:80. 1836, (Type: Poppig 1293).

Cissampelos kohautiana Presl, Reliqu. Raenk. 2:81 1836, ex char.

Cissampelos acuminata Benth. Pl. Hartw. 415. 1840 (Type: Hartweg 445).

Cissampelos canescens Miq. Sert. Exot. 7. t.4. 1842 (Type: Coulter 659).

Cissampelos nephrophylla Bojer, in Ann. Sc. Nat. 2. ser. 20:54. 1843.

Cissampelos cordifolia Bojer, in Ann. Sc. Nat. 2. ser. 20:54. 1843.

Cissampelos cumingiana Turcz. in Bull. Soc. Imp. Des. Nat. 27:283. 1854, ex char. (Type: Cuming 691).

Cissampelos pannosa Turcz. in Bull. Soc. Imp. Des. Nat. 27:283. 1854, ex char. (Type: Linden 1809).

Cissampelos smalzmanni Turcz. in Bull. Soc. Imp. Des. Nat. 27:284. 1854, ex char. (Type: Smalzmann s.n.).

Cissampelos discolor DC. var. cardiophylla Gray, Bot. Unit. St. Expl. Exped. 38. 1854.

Cissampelos eriocarpa Triana & Planch. in Ann. Sc. Nat. ser. 4. 17:40. 1862 (Type: Triana s.n.).

Cissampelos glaucescens Triana & Planch. in Ann. Sc. Nat. ser. 4. 17:41. 1862 (Type: Goudot s.n.).

Cissampelos subreniformis Triana & Planch. in Ann. Sc. Nat. ser. 4. 17:41. 1862 (Type: Triana s.n.).

Cissampelos pareira L. a pareira Eichl. in Mart. Fl. Bras. 13. 1:190. 1864.

Cissampelos pareira L. B caapeba Eichl. in Mart. Fl. Bras. 13. 1:190. 1864.

Cissampelos pareira L. ∂ racemiflora Eichl. in Mart. Fl. Bras. 13. 1:190. 1864.

Cissampelos pareira L. δ monoica Eichl. in Mart. Fl. Bras. 13. 1:190. 1864.

Cissampelos pareira L. var. orbiculata (DC.) Miq. in Ann. Mus. Lugd. Bat. 4:85. 1868 (Type: Roxburgh s.n.).

Dissopetalum mauritianum Miers, in Ann. Nat. Hist. 3. ser. 17:267. 1866; in Contrib. Bot. 3:203. 1871.

Cissampelos longipes Miers, in Ann. Nat. Hist. ser. 3. 17:134. 1866, nom. nud; in Contrib. Bot. 3:139. 1871 (Type: Rohr s.n.)

Cissampelos testudinum Miers, in Ann. Nat. Hist. ser 3. 17:134. 1866, nom. nud; in Contrib. Bot. 3:143. 1871. (Type: Darwin 239).

Cissampelos limbata Miers, in Ann. Nat. Hist. ser. 3. 17:134. 1866, nom. nud.; in Contrib. Bot. 3:143. 1871 (Type: Holton 668).

Cissampelos benthamiana Miers, in Ann. Nat. Hist. ser. 3. 17:144. 1866, nom. nud; in Contrib. Bot. 3:144. 1871, ex char. (Type: Hartweg 445).

Cissampelos auriculata Miers in Ann. Nat. Hist. ser. 3. 17:135. 1866, nom. nud.; in Contrib. Bot. 3:158. 1871. (Type: Tweedie s.n.).

Cissampelos hederacea Miers in Ann. Nat. Hist. ser. 3. 17:135. 1866, nom. nud.; in Contrib. Bot. 3:159. 1971 (Type: Tweedie s.n.).

Cissampelos consociata Miers, in Ann. Nat. Hist. ser. 3. 17:135. 1866, nom. nud.; in Contrib. Bot. 3:167. 1871 (Type: Wilson s.n.).

Cissampelos diffusa Miers, in Ann. Nat. Hist. ser. 3. 17:136. 1866, nom. nud.; in Contrib. Bot. 3:168. 1871 (Type: Gouan s.n.).

Cissampelos madagascariensis Miers, in Ann. Nat. Hist. 3. ser. 17:136. 1866, nom. nud.; in Contrib. Bot. 3:181. 1871, non (Baill.) Diels (1910) (Type: Thompson s.n.).

Cissampelos bojeriana Miers, in Ann. Nat. Hist. ser. 3. 17:182. 1866, nom. nud.; in Contrib. Bot. 3:182. 1871, ex char.

Cissampelos diversa Miers, in Ann. Nat. Hist. ser. 3. 17:137. 1866, nom. nud.; in Contrib. Bot. 3:187. 1871.

Cissampelos elata Miers, in Ann. Nat. Hist. ser. 3. 17:137. 1866, nom. nud.; in Contrib. Bot. 3:187, ex char.

Cissampelos grallatoria Miers, in Ann. Nat. Hist. ser. 3. 17:137. 1866, nom. nud.; in Contrib. Bot. 3:189. 1871, ex char. (Type: Wallich 4977).

Cissampelos discolor Miers, in Ann. Nat. Hist. ser. 3. 17:138. 1866, nom. nud.; in Contrib. Bot. 3:191. 1871, non DC. (1818) (Type: Cuming 1440).

Cissampelos delicatula Miers, in Ann. Nat. Hist. ser. 3. 17:138. 1866, nom. nud.; in Contrib. Bot. 3:197. 1871. (Type: Hadras 60).

Cissampelos subpeltata Thwait. ex. Miers in Contrib. Bot. 3:195. 1871 (Type: Thwaites 168).

Cissampelos pareira L. var. peltata Scheff. in Nat. Tijdsch. 32:401. 1873, ex char.

Cissampelos boivini Baill. in Bull. Soc. Linn. Paris. 58:460. 1885, ex char. (Type: Boivin s.n.).

Cissampelos pareira L. var. mucronata (A. Rich.) Engl. subvar. crassifolia Engl. in Engl. Bot. Jahrb. 26:394. 1899.

Cissampelos pareira L. var. mucronata (A. Rich.) Engl. subvar. usambarensis Engl. in Engl. Bot. Jahrb. 26:395. 1899 (Type: Buchwald 627).

Cissampelos pareira L. var. transitoria Engl. subvar. madagascariensis (Miers) Engl. and subvar. wakefieldii Engl. in Engl. Bot. Jahrb. 27:396. 1899.

Cissampelos pareira f. reniformis Chod. & Hassl. in Bull. Herb. Boiss. ser. 2. 3:420. 1903 (Type: Hassler 5477).

Cissampelos pareira f. emarginato-mucronata Chod. & Hassl. in Boiss. ser. 2. 3:420. 1903 (Type: Hassler 6198).

Cissampelos pareira L. var. a. typica Diels, in Engl. Pflanzen. 4(94):288. 1910.

Cissampelos pareira L. var. β. laevis Diels, in Engl. Pflanzen. 4(94):292. 1910 (Type: Plumier s.n.).

Cissampelos pareira L. var. ν. haenkeana (Presl) Diels, in Engl. Pflanzen. 4(94):292. 1910.

Cissampelos pareira L. var. δ. nephrophylla (Bojer) Diels, in Engl. Pflanzen. 4(94):292. 1910.

Cissampelos pareira L. var. ε. mauritiana (Thou.) Diels, in Engl. Pflanzen. 4(94):293. 1910.

Cissampelos pareira L. var. ϱ. caapeba (L.) Diels, in Engl. Pflanzen. 4(94):293. 1910.

Cissampelos pareira L. var. η. tamoides (Willd.) Diels, in Engl. Pflanzen. 4(94):293. 1910.

Cissampelos pareira L. var. ʒ. gardneri Diels, in Engl. Pflanzen. 4(94):294. 1910. (Type: Gardner 2012).

Cissampelos pareira L. var. ι. australis (St. Hil.) Diels, in Engl. Pflanzen. 4(94):294. 1910.

Cissampelos ellenbeckii Diels, in Engl. Pflanzen. 4(94):296. 1910 (Type: Ellenbeck 361c!).

Cissampelos tomentocarpa Rusby, Desc. Sps. So. Am. 17. 1920. (Type: Williams 616).

Cissampelos violaefolia Rusby, in Mem. N.Y. Bot. Gard. 7:240. 1927 (Type: Cardenas 2015!).

Cissampelos piolanei Gagnep. in Hubert Suppl. Fl. Gen. 1:137. 1938, ex char.

Suffrutescent twiners to 8 m from thickened root, sometimes forming mat on the ground or scrambling on undergrowth and rocky ledges; stems striate, young stems glabrous to tomentose, rarely sericeous. Leaves petiolate, basifixed or peltate to 15 mm, cordate to suborbicular, rarely deltoid, entire to undulate, the apex acute to rounded, rarely acuminate, frequently emarginate, mucronate, the base cordate to truncate or rounded, rarely attenuate, (3-)6.0(-15) cm long, (3-)6.0(-17) cm wide, membranous, palmately 5- to 12-nerved, usually prominent below, glabrous to pilose or sericeous above, rarely densely pilose or tomentose, paler below and pilose or sericeous to tomentose, rarely glabrous or puberulent; petioles (1-)4.2(-13) cm long, puberulent to tomentose, rarely sericeous or glabrous. Staminate inflorescence multi-flowered fasciculate dichasia arranged as cymose clusters axillary from normal leaves or upon secondary bracteate or ebracteate racemiform or paniculiform axillary branches to 27 cm or as cymose clusters within the axils of reduced leaves of secondary branches; 1-6, rarely indefinite, dichasia per fascicle; peduncle of cymes at length 3 cm long, pilose to tomentose, rarely puberulent; bracts of secondary branches, if present, basifixed, sessile or petiolate to 10 mm, reniform to ovate, rarely suborbicular, mucronate, entire or rarely involute, at length 28 mm long and wide, membranous, pilose to tomentose, rarely puberulent or sericeous; bracteoles about 1 mm long, pilose. Staminate flowers various hues of green, white or yellow: sepals 4, obovate to elliptic or rarely ovate, (0.7-)1.1(-1.8) mm long, (0.5-)0.7(-1.3) mm wide, exteriorly puberulent to pilose; corolla patelliform, (0.6-)0.9(-1.3) mm in diameter, rarely cupuliform, glabrous to pilose exteriorly; synandrium sessile to 0.8 mm long, anthers 4 or rarely 5-6, glabrous. Pistillate inflorescence composed of 5-10 individual flowers fasciculate on bracteate, rarely ebracteate, racemiform secondary branches; bracts basifixed, sessile or petiolate to 10 mm, usually remiform but varying from cordate to suborbicular, entire or sometimes undulate, rarely involute, mucronate, at length 2.4 cm long, 2.6 cm wide, frequently grading to minute, membranous, puberulent to tomentose, rarely glabrous or sericeous. Pistillate flowers greenish-yellow: sepal 1, obovate, elliptic or suborbicular, (0.8-)1.3(-2.0) mm long, (0.4-)0.9(-1.2) mm wide, exteriorly pilose; petal 1, rarely bilobed, quadrangulate to deltoid, sometimes reniform or suborbicular, (0.4-)0.6(-0.9) mm long, (0.4-)0.8(-1.5) mm wide, exteriorly pilose, rarely puberulent or glabrous; carpel 1, gibbose, (0.5-)0.7(-1.0) mm long, pilose to tomentose. Drupe red or yellowish, obovoid, (3-)4.1(-6) mm long, (3-)3.9(-5) mm wide, puberulent to pilose, rarely sericeous or glabrous; fruiting stalk (1-)2.6(-5) mm long.

North, Central, and South America, Asia and Africa.

UNITED STATES: FLORIDA: Snapper Creek, 12 miles south of Miami, Simpson s.n. (US), Small and Mosier s.n. (NY); Matheson Hammock near Miami, Marquand s.n. (NY).

BAHAMAS: ANDROS I: Nicholl's Town, road to Louisa Coppice, Bruce 6897 (F,NY), 6716 (F,NY).

BARBADOS: Bathsheba, Waby 47 (F); Pine Estate, Freemen 218 (NY).

CUBA: CAMAGUEY: La Gloria, Shafer 206 (GH,NY); Jaqueyal, Eggers 4755 (US). LA NABANA: Loma de Cosilla, León 2431 (NY); La Habana, Ekman 678 (NY); Isla de Pinos, Blain 52 (F), Taylor 143 (NY), Curtiss 283 (F,GH,NY), Britton and Wilson 15129 (F,NY), Jennings 567 (GH,NY), Britton, Britton and Wilson 14967 (US,NY); San Antonio de los Baños, Hermann 827 (F,NY). LAS VILLAS: Cienfuegos, Combs 278 (NY,F,MO), Jack 5288 (GH), 6691 (GH), 5877 (GH), 4976 (GH); Trinidad, Morton 4174 (US); Cumanayagua, Senn 348 (GH), Howard 5653 (GH); San Blas, Rehder 1146 (GH), Jack 5919 (GH), Salvoza 644 (GH) Smith, Hodgdon and Gonzales 3307 (GH); Soledad, Howard 5138 (GH), Gonzales 107 (GH,NY). ORIENTE: Sierra de Nipe, Cayo del Rey, Carabia 4033 (NY); Santiago de Cuba, Millspaugh 1121 (F), 1120 (F), Clement 126 (NY), Britton 1883 (NY), Palmer 377 (F,NY,MO), Blake 7263 (US), Britton, Britton and Cowell 12817 (NY), 12851 (US,NY); Lopez 231 (US); Holguin, Shafer 1325 (F,NY); Bayate, Ekman 8561 (F); Baracoa, Webster 4039 (US); Río Mayari, Shafer 3692 (US,NY); Gran Piedra Mt., Lopéz 863 (US). PINAR DEL RIO: Río Mestanza, Britton, Britton and Cowell 10151 (NY);San Diego to Las Yeguas, León and Agathauge 4890 (NY); Guanajay, Hermann 212 (F,NY); Pinar del Río, Palmer and Riley 51 (US), 17 (NY); without precise locality, Shafer and León 13690 (F,NY). SANTA CLARA: Hoyo de Manicaragua, Britton, Britton and Cowell 10151 (NY); Mina Carlota near Cumanayagua, Senn 385 (NY); Siguanea, Britton and Wilson 4981 (NY); Soledad, Howard 5138 (NY); Lomas de Banaeo, León 320 (NY).. Without Precise Locality: Wright 22 (GH,MO), 21 (GH), Rugel 298 (US), Luna 30 (NY), Hioram 1783 (NY), Leon, Clement and Roca 10426 (NY).

DOMINICAN REPUBLIC: AZUA: Azua, Rose, Fitch and Russell 3989 (US,NY). BARAHONA: Polo, R.A. and E.S. Howard 8445 (NY,GH); without precise locality, Fuertes 161 (F,MO,NY). BENEFACTOR: San Juan, Miller 1234 (US). LA VEGA: Jarabacoa, Augusto 845 (NY); Piedra Blanca, Allard 13739 (US); Constanza, Jiménez 2135 (US). MONTE CRISTI: Monción, Mera 2076 (US). PUERTO PLATA: Cordillera Septentrional, Bajabonica, Ekman 14484 (US). SAMANÁ: Samaná peninsula, Abbott 271 (US), 1148 (US), 2375 (US), Ekman 15229 (US). SANTIAGO: Santiago, Allard 14549 (US); without precise locality, Valeur 847 (US,MO,NY), 907 (US,NY,MO), 915 (US,MO,NY). SANTO DOMINGO: Colonia Ramfis, Allard 14977 (GH); Ciudad Trujillo, Allard 13846 (US), 19138 (US); without precise locality, Fuertes 571 (GH,NY), Eggers 2136 (US,NY), 1528 (US,NY,GH), Rose, Fitch and Russell 4106 (US,NY), Wright, Parry and Brummel 537 (US). SEIBO: Hiqüey, R.A. and E.S. Howard 9831 (GH,NY); Seiba, Abbott 2517 (US); Monte Redondo, Abbott 2783 (GH). Without Precise Locality: Augusto 739 (NY), 817 (NY), 860 (NY), 338 (NY).

GUADELOUPE: ST. MARTIN: without precise locality, Boldingh 3191 (NY). Without Precise Locality: Stehle 1545 (GH), Duss 2586 (F,MO, NY), Questel 4184 (US).

HAITI: ARTIBONITE: Ennery, Leonard 8891 (F). NORD: Pilate, Leonard 9660 (GH); St. Michael de l'Atalaye, Leonard 7213 (US,NY), 7613 (US,NY); Cap-Haitïen, Ekman 2761 (US), Nash 953 (NY); Marmelade, Leonard 8408 (US). NORD-OUEST: Môle-St. Nicolas, E. and G. Leonard 13318 (GH); Île de la Tortue, E. and G. Leonard 15496 (US); Bombardopolis, E. and G. Leonard 13247 (US); Bord do Mer, E. and G. Leonard 12900 (US); Jean-Rabel, E. and G. Leonard 13706 (US); Port-de-Paix, E. and G. Leonard 14715 (US). QUEST: Margot, Nash 363 (F,NY), 270 (NY), 181 (F,NY), 240 (F); Port-au-Prince, Holdridge 968 (F,NY); Pétionville, Leonard 5040 (GH,NY), 4949 (GH,NY), Nash 1000 (NY), 977 (NY); Fond Verrettes, Leonard 3796 (GH), 3961 (US); Île de la Gonâve, Eyerdam 107 (GH). SUD: Miragoâna, Eyerdam 557 (GH). Without Precise Locality: Leonard 4573 (US,NY), Miller 182 (US), Nash and Taylor 1055 (NY).

JAMAICA: CORNWALL: Lucea to Montego Bay, Britton 2907 (NY); Ramgoat Cave, Howard, Proctor and Stearn 14671 (GH). MIDDLESEX: Mandeville, Brown 11 (NY), 25 (NY), Crawford 750 (NY), Britton 3220 (NY), 982 (NY); Spanish Town, Britton 3089 (NY); Albiou Pen, Harris 11999 (US,NY); Grier Mount, Proctor 6485 (US); Mount Diablo, Maxon and Killip 532 (F); Pike, Proctor 18310 (GH). SURREY: Kingston, Britton 803 (NY); Hope Bay, Harris 6968 (F); Rockfort, Maxon and Killip 1390 (F,NY); Eleven Mile, Lewis s.n. (US); Hope Gardens, Maxon 1668 (US); Belleview near Constant Springs, Britton 950 (US,NY); Constant Springs, Philipson 548 (NY). Without Precise Locality: Yuncker 17093 (F), Hart 668 (F), Harris 8737 (F,NY), Howard and Proctor 14484 (GH), 13788 (GH), Killip 95 (US), Harris and Lawrence C15116 (US), Maxon 8778 (US), 2820 (US), Hunnewell 14161 (GH), Norman 54 (MO), 189 (MO), Crosby, Hespenheide and Anderson 340 (MO,NY), Britton 3363 (NY).

LEEWARD ISLANDS: ANTIGUA: Sugar Loaf Mt., Box 772 (GH,MO), 1008 (US). MONTSERRAT: Ganbaldi Hill, Shafer 315 (F,NY). VIRGIN ISLANDS: Tortola, Fishlock 306 (GH,NY).

MARTINIQUE: Without Precise Locality: Duss 1041 (NY), 1040 (NY), 1038 (NY), 1039 (NY).

NETHERLANDS ANTILLES: BONAIRE: without precise locality, Boldingh 7411 (NY). CURACAO: St. Christoffelberg, Arnoldo 1929 (GH).

PUERTO RICO: CAGUAS: Caguas, Underwood and Griggs 351 (F,NY), 305 (US,NY); Cayey to Guayama, Underwood and Griggs 329 (US,NY), 521 (NY); Cayey to Caguas, Underwood and Griggs 350 (US,NY), CAYEY: Cayey, Kuntze 419 (NY), 206 (NY), 230 (NY). CULEBRA: Culebra Island, Britton and Wheeler 126 (US,NY). FAJARDO: Fajardo, Urban 326 (NY). HUMACAO: Humacao, Sintenis 5186 (US). LUQUILLO: Luquillo, Wilson 282 (F,US,NY). MAYAGÜEZ: Las Mecas, near Mayagüez, Holm 204 (MO), Mayagüez, Britton and Marble 667 (US,NY). NAGUABO: Rio Blanco, Sintenis 5354 (US); Loma La Mina, Shafer 3255 (US,NY). SAN JUAN: Rio Piedras, Heller 1283 (NY), Stevenson 1971 (F), 259 (US), Johnston 259 (NY), Hioram s.n. (NY). TOA BAJA: Sabana Seca, Otero 564 (F,MO).

UTUADO: Mount Morales, near Utuado, Britton and Cowell 821 (NY). YAUCO: Yauco, Garber 47 (GH,NY), Sargent 223 (US). Without Precise Locality: Sintenis 326 (F,US,NY), Heller 332 (F), 1283 (F), Wydler 207 (F), Shevsholm 204 (F,MO,NY), Shafer 2482 (NY,US), Stevenson 4357 (US), Britton and Shafer 2143 (NY).

TRINIDAD AND TOBAGO: TOBAGO: Roseborough, Purseglove P6317 (NY); Logwood Park, Broadway 2959 (F,MO); Richmond, Fairchild s.n. (US); without precise locality, Eggers 5521 (NY), 5621 (NY). TRINIDAD: Moruga, Britton and Broadway 2422 (US,NY); San Juan, Johnston 38 (GH), 76 (GH,NY); Arena Government Forest, Broadway 9174 (GH,MO); without precise locality, Kuntze 618 (NY), 924 (NY), Fendler 206 (NY).

VIRGIN ISLANDS (U.S.): ST. CROIX ISLAND: Mt. Eagle, Thompson 426 (GH), 577 (GH); Signal Hill, Ricksecker 184 (F,NY,MO), 436 (F,MO); Frederiksted, Rose, Fitch and Russell 3514 (NY,US); Christiansted, Rose, Fitch and Russell 3593 (US). ST. JOHN ISLAND: Bordeaux Mt., Britton and Shafer 591 (US). ST. THOMAS ISLAND: Belgian Road, Britton, Britton and Shafer 57 (US,NY); without precise locality, Eggers 23 (GH).

BRITISH HONDURAS (BELIZE): BELIZE: Belize, Gentle 19 (F,NY). CAYO: Cayo, Bartlett 11563 (F); Mai Fire Lookout Station, Dwyer, Elias and Maxwell 198 (MO); Central Farm, Dwyer, Elias and Maxwell 285 (MO,US). NORTHERN: Corozal, Gentle 415 (F), 4859 (NY), 595 (F), 4919 (NY), Lundell 4919 (MO). Without Precise Locality: Peck 274 (GH).

COSTA RICA: ALAJUELA: Atenas, Smith P2488 (GH), P2461 (GH); San Ramón, Brenes 14319 (GH), 22323 (NY), 14318 (NY), 5757 (F), Smith 2817 (F). CARTAGO: Cartago, Stork 4700 (GH), 1068 (GH), 307 (US), Cooper 5703 (GH); Las Cóncavas, Cooper 49 (F); Corinto, Williams 16553 (F). GUANACASTE: Río San Jóse, Dodge and Thomas 6436 (MO); Tilarán, Dodge 6199 (MO); Standley and Valerio 46551 (US), 44436 (US). SAN JOSÉ: Santa Ana, Jiménez 3529 (NY); El General, Skutch 2548 (GH,MO), 4283 (GH,MO,NY); San José, Tonduz 7287 (US), 781 (F,US), Skutch 2548 (NY), Valerio 197 (F). Without Precise Locality: Tonduz 13804 (F), 17872 (US)8068 (US), 8459 (US), 9618 (US), 11403 (US), Roever 5300 (F), León 420 (F), Valerio 1447 (F), 39 (US), Dodge 6199 (US), Echeverria 38 (F), Laukeke K103 (F), Pittier 12154 (US).

EL SALVADOR: AHUACHAPÁN: Ahuachapán, Standley 19718b (US). SAN SALVADOR: Finca San Nicolás, Calderón 1568 (NY), San Salvador, Velasco 8920 (GH,US), Standley 23118 (GH), Renson 225 (NY); Tonacatepeque, Standley 19491 (GH). SANTA ANA: Metapán, Carlson 747 (F), 796 (F). SAN VINCENTE: San Vincente, Standley and Padilla 3782 (F). SONSONATE: Izalco, Standley 21862 (US); Sonsonate, Standley 22322 (US). Without Precise Locality: Renson 337 (NY).

GUATEMALA: ALTA VERAPAZ: Pancajché, Standley 70631 (F); San José, Standley 69661 (F); Secanquim, Cook and Griggs 304 (US), Pittier 188 (US,NY), Maxon and Hay 3183 (US,NY); Tactic, Standley 90393 (F); Cobán, Tuerckheim 1137 (GH). BAJA VERAPAZ: Patal, Standley 90964 (F). CHIQUIMULA: Concepción, Pittier 1894 (US);

Quezaltepeque, Steyermark 31415 (F). EL PETÉN: La Libertad, Aquilar 392 (MO,NY), Lundell 3737 (NY); Yaloch, Bartlett 12853 (US), 12857 (US); without precise locality, Lundell 3432 (F). EL QUICHÉ: Sacapulas, Standley 62531 (F); San Siguan, Heyde and Lux 2905 (GH, MO,NY); without precise locality, Aquilar 1150 (F). ESCUINTLA: San José, Standley 64051 (F); Río Guacalate near Escuintla, Standley 89308 (F); without precise locality, Tonduz and Rojas 59 (US), Seler 2572 (GH,NY). GUATEMALA: Guatemala, Standley 62977 (F); Amatitlán, Smith 1880 (GH); without precise locality, Kellerman 4587 (US), Morales 621 (US), Smith 1881 (US). HUEHUETENANGO: Puente El Aquilar, Standley 81427 (F); between San Rafael Pétzal and Colotenango, Steyermark 50544 (F); without precise locality, Seler 2996 (GH,NY). IZABAL: Quebradas, Blake 7532 (US); Quiriguá, Standley 23814 (GH), Steyermark 38314 (F); Murcielago, Lake Izabal, Popenoe 6 (F); Puerto Barrios, Standley 73105 (F). JALAPA: Jalapa, Standley 76491 (F), Steyermark 32082 (F). QUEZALTENANGO: Aguas Amargas, Standley 65398 (F); Santa María de Jesús, Standley 84849 (F). RETALHULEU: San Andres, Smith 1482 (F,NY); Retalhuleu, Standley 88325 (F). SACATEPEQUEZ: Mazatenango, Kellerman 5141 (US). SAN MARCOS: Slope of Volcán Tajumulco near El Porvenir, Steyermark 37721 (GH); between Ocós and Ayutla, Steyermark 37897 (F). SOLOLÁ: Patalul, Kellerman 5807 (US). AZCAPA: Gualan, Deam 301 (GH,NY). Without Precise Locality: Hedge 52/262 (F,US), Tonduz 656 (US,NY), Ruano 318 (US), Deam 6058 (MO,NY).

HONDURAS: Atlántida: Tela, Mitchell 104 (F), Standley 53532 (F), Standley 55171 (F), Van Severén 74 (US); Isla Roatán, Gaumer 126 (F); La Ceiba, Yuncker, Koepper and Wagner 8307 (GH,MO,NY). COMAYAGUA: Siguatepeque, Yuncker, Dawson and Youse 5743 (F,MO); Lake Yojoa, Kamb 2152 (GH); Ajuterique, Rodriquez 2605 (F). CORTES: Potrerillos, Yuncker 4891 (F,MO). EL PARAISO: Quebrada del Ingenio de los Angeles, Williams and Molina 12040 (F), 11205 (F). FRANCISCO MORAZÁN: Tegucigalpa, Moldenke 19814 (NY); Morazán, Molina 316 (F,MO); San Antonio de Oriente, Standley 21075 (F); El Zamorano, Williams and Molina 10456 (F,MO), Standley 16032 (F), 284 (F), Rodriquez 607 (F); Río Capa Rosa, Williams and Molina 12700 (F,MO); Pedregal, Glassman 1691 (F,NY), Molina 112 (F); Río de la Orilla, Rodriquez 816 (F); without precise locality, Rodriquez 76 (F), 518 (F), 607 (F). OLANCHO: Juticalpa, Standley 18031 (F). SANTA BARBARA: San Pedro Sula, Thieme 5126 (GH, NY), 5128 (GH). SWAN ISLANDS: Nelson 92 (GH) 9 (F).

MEXICO: CHIAPAS: Siltepec, Matuda 15616 (F), 4357 (F,NY), 4420 (F), 1575 (GH,US,MO,NY); between Mazapa and Motozintla, Matuda 4817 (NY); Escuintla, Matuda 16076 (F), 1800 (NY); Tuxtla, Seler 1947 (GH); Palenque, Matuda 3809 (GH); Tonalá, Matuda 17150 (NY,F); Mazapa, Matuda 4817 (GH). COLIMA: Colima, Orcutt 4561 (F,MO), Palmer 1140 (GH,NY). GUERRERO: Atoyac, Matuda 1468 (GH,MO,NY); Chilapa, Ortega 6195 (GH); Iguala, Rose, Painter and Rose 9420 (US). HIDALGO: Tamazunchale, Clark 7018 (MO); Huejutla, Seler 897 (GH); Molango, Moore 2990 (GH); Jacala, Moore 2879 (GH). JALISCO: San Sebastian, Mexia 1443 (MO,NY); Zapotlan, Pringle 4376 (F,MO,NY), Tuxpan, Purpus 491 (US,MO); La Palma, Jones 49 (US,MO); Santa

Cruz, Jones 50 (US). MEXICO: Temascalapa, Hinton 5893 (GH,MO), 3180 (GH), 4332 (US). MICHOACÁN, Uruapan, King and Soderstrom 4899 (NY). NAYARIT: Aguacatlan, Gregg 926 (MO); Marie Madre Island, Malthy 151 (US,NY), Nelson 4262 (F), 4233 (GH), Mason 1776 (F), Solis 13 (US); Acaponeta, Rose 1471 (GH,NY); Tepic, Jones 22948 (GH), Mexia 582 (GH,MO). NUEVO LEON: Galeana, Hinton 14724 (GH,NY). OAXACA: Uberto, Williams 9373 (F); Fochutla, Conzatti 3206 (US); Choapam, Mexia 9207 (NY,F,MO); without precise locality, Galeotti 4624 (US). SAN LUIS POTOSI: Tamazunchall, Clark 7018 (NY); Tamasopo, Pringle 3516 (F). SINALOA: Colomas, Rose 1700 (US); Villa Unión, Rose, Standley and Russell 13899 (F,MO,NY); San Ignacio, Montes and Salazar 302 (US), 353 (US), 753 (US); San Blas, Rose, Standley and Russell 13379 (US,NY); Guadalupe, Rose, Standley and Russell 14761 (US,NY). SONORA: Alamos, Rose, Standley and Russell 13098 (US). Tabasco: San Juan Bautista, Rovirosa 23 (NY); Balancán, Matuda 3058 (F,NY); without precise locality, Rovirosa 297 (US). TAMAULIPAS: Gomez Farias, Palmer 316 (F,NY) 340 (US). VERA CRUZ: Orizaba, Muller 3011 (NY), 839 (NY), Botteri 232 (F), Botteri and Lumichrast 1580 (US), Bourgeau 2444 (GH); Tezonapa, Orcutt 3111 (F,MO); Jalapa, Pringle 7767 (F,MO), Smith 1443 (MO); Zacaulpan, Hedges 2958 (F), Purpus 12023 (US), 15301 (US), 2958 (US,MO,NY), 17129 (GH); Nogales, Matuda 1176 (GH,MO,NY); San Francisco near Veracruz, Smith 1443 (GH); Cordoba, Bourgeau 1952 (GH), 2528 (GH,F); without precise locality, Muller 4136 (NY); Papanula, Seler 3638 (GH,US); Teocelo, Goldman 683 (US). YUCATAN: Chichen Itzá, Steere 1324 (NY); Mérida, Schott 500 (F), 91 (F); Píste, Steggerda 41 (F); El Paso, Lundell 1525 (GH,NY); Izamal, Gaumer 484 (NY,F,MO); Kancaboonot, Gaumer and Sons 23591 (F); Suitun, Gaumer and Sons 23367 (F,MO,NY); Tuxpeña, Lundell 1179 (F); without precise locality, Gaumer 24102 (F,US,MO), 24010 (US,F). Without Precise Locality: Kerber 390 (US), Conzatti 3093 (US), 3542 (US), Mexia 1443 (GH), Coulter 659 (GH).

NICARAGUA: CARAZO: Jinotepe, Standley 8476 (F). CHINANDEGA: Chinandega, Baker 48 (GH,MO,NY), 816 (US). ESTELÍ: Estelí, Standley 20291 (F). JINOTEGA: Las Mercedes, Standley 10609 (F). LAKE NICARAGUA: Omotepe Island, Shimek and Smith 39 (F). MANAGUA: El Crucero, Standley 8144 (F); Managua, Garnier A1304 (F), Maxon, Harvey and Valentine 7490 (US); Casa Colorado, Maxon, Harvey and Valentine 7358 (GH), 7425 (US). MATAGALPA, Cordillera Central, L. and T. Williams 25042 (NY). ZELAYA: between El Recreo and El Pijibaye, Standley 19880 (F); Isabel, Molina 2489 (F); La Crúz, Molina 2360 (F), Grant 974 (F). Without Precise Locality: Chaves 316 (US).

PANAMA: BOCAS DEL TORO: Chiriquí Lagoon, Wedel 2691 (MO), 1309 (GH,MO). CANAL ZONE: Las Cruces Trail, Hunter and Allen 752 (MO); Miraflores, White 122 (MO), 120 (MO,NY); Curundu, Tyson 1055 (MO); Río Cocoli, Stearn, Chambers, Dwyer and Ebinger 304 (MO); Gatún, Lewis, MacBryde and Oliver 1814 (MO), Hayes 1035 (NY), 922 (NY); Fort Kobe Road, Woodson, Allen and Seibert 1426 (F,MO,NY), 1425 (MO,NY,F); Gamboa, Heriberto 88 (GH,NY), Standley 28348 (US); Barro Colorado Island, Ebinger 642 (MO), Shattuck 476 (MO), Aviles 888 (F),

921 (F), 57 (F), Wetmore and Abbe 178 (F), 177 (F), Bailey 575 (GH); Ancon Hill, Woodson, Allen and Seibert 1324 (GH,NY), Culebra, Pittier 2092 (US), 2218 (US); Summit, Woodson, Allen and Seibert 766 (GH,MO,NY), Standley 25672 (US); Mamei Hill, Pittier 3796 (US); Darién Station, Standley 31642 (US); Juan Mina, Piper 5688 (US); Obispo, Standley 31773 (US); Empire to Mandinga, Piper 5480 (US); Red Tank, Maxon and Harvey 6578 (US,NY); Balboa, Standley 25526 (US); without precise locality, Lindsay 248 (US), Ebinger 304 (MO). CHIRIQUÍ: Boquete, Davidson 611 (F,MO); Cerro Vaca, Pittier 5323 (F,GH,NY); Bajo Chorro, Woodson and Schery 682 (US). COCLÉ: El Valle de Antón, Allen 3705 (MO,NY); Club Campastre, Duke 13265 (NY); La Pintada, Hunter, and Allen 581 (US). DARIÉN: Cerro Campana, Duke 8638 (NY); El Real to Pinogana, Duke 5130 (MO); Tuira, Stearn, Chambers, Dwyer, Ebinger 143 (MO); Ilsa Boca Grande, Duke 8845 (MO); without precise locality, Macbride 2699 (F). LOS SANTOS: Loma Prieta, Duke 11796 (NY), Lewis, Baker, MacBryde and Oliver 2215 (MO); Macaracas, Lewis, MacBryde, Oliver and Ridgway 1609 (MO). PANAMÁ: Chepo, Hunter and Allen 91 (MO); El Llano, Tyson 1740 (MO); Rio Mamoni beyond Chepo, Duke 5581 (MO), 5579 (MO); Bejuco, Duke 4563a (MO); Chilibre, Dwyer 1016 (MO); Bella Vista, Piper 5370 (US), Heriberto 221 (US); near Tapía River, Juan Días region, Maxon and Harvey 6760 (US,NY); Panamá, Maxon, Harvey and Valentine 7085 (US, NY); Sabanas, Brother Paul 21 (US), 40 (US). VERAGUAS: Santiago, Duke 12362 (NY), 12370 (NY); Piria, Duke 14433 (NY); Las Palmas, Standley 33189 (US); La Hondura, Standley 37599 (US); La Verbena, Standley 32282 (US). Without Precise Locality: Woodson and Schery 545 (F), Williams 536 (NY).

ARGENTINA: CATAMARCA: La Merced, Lorenty and Hieronymas 1234 (F); Andalgalá, Jörgensen 1558 (GH,MO). CHACO: Fontana, Meyer 2016 (F). CORRIENTES: General Paz, Shwarz 252 (NY); Esquina, Rodrigo 955 (NY); Empedrado, Pederson 4575 (US), Ibarrola 3061 (NY); Mburucuyá, Pederson 1329 (US,MO,NY), Burkart 19410 (US); without precise locality, Ibarrola 898 (US). ENTRE RÍOS: Victoria, Burkart 8737 (F,NY). FORMOSA: Formosa, Jörgensen 2383 (GH,MO), Eyerdam and Beetle 22989 (GH). JUJUY: Jujuy, Moldenke 19752 (NY). MISIONES: Posadas, Ekman 1515 (MO), 1518 (NY). SALTA: Mostan, O'Donnel 2587 (NY); Guachipas, Meyer 3590 (NY); Alemania, Meyer 3590 (GH), Venturi 9907 (GH,NY); Coronel Moldes, Meyer 3589 (GH); without precise locality, Venturi 3768 (US), 9907 (US,MO), 9909 (US). SANTA FE: Orillas Parana Mini, Meyer 2764 (NY); Reconquista, Parodi 11127 (F). SANTIAGO DEL ESTERO: Without precise locality, Venturi 5840 (US). TUCUMÁN: Capital, Meyer 3916 (NY); Pueblo Viejo, Moldenke 19719 (NY); Burruyacú, Venturi 7467 (F); Rio Chico, Meyer 4405 (GH); without precise locality, Lorenty and Hieronymus 1126 (F), Venturi 9051 (GH,MO), 35b (GH), 6138 (GH,MO), 2185 (GH). Without Precise Locality: Meyer 827 (GH,NY).

BOLIVIA: BENI: Rio Chaparé to Rio Mamoré, Werdermann 2233 (MO); Trinidad, Werdermann 2322 (MO). LA PAZ: Mapiri, Buchtein 1260 (US). Bang 1553 (MO). SANTA CRUZ: Lagunillas, Cárdenas 2808 (F); Buena Vista, Steinbach 1468 (GH), 1602 (GH,NY), 1490 (NY); without precise locality, Steinbach 6308 (GH), 2095 (GH), Cárdenas 4704 (US).

Without Precise Locality: Buchtien 757 (F,MO,NY), 394 (US), Rusby 2422 (F), 1441 (NY), 1444 (NY), Brooke 5927 (NY), Bang 2422 (F,MO, NY).

BRAZIL: AMAZONAS: Bõa Vista, Black 51-12661 (NY); Tefé, Pires 1298 (US,NY). DISTRITO FEDERAL: Lagôa Paranoá, Irwin, Souza and Santos 8407 (NY), 9094 (NY); Universidade de Brasília, Irwin, Souza and Santos 8702 (NY); Córrego Landím, Irwin, Souza and Santos 11350 (NY). GOIÁS: Serra do Caiapó, France and Silva 59466 (NY); Corumba de Goias, Irwin, Souza and Santos 10797 (NY); without precise locality, Gardner 3002 (GH). MATTO GROSSO: Sao Luiz de Cáceres, Hoehne 4079 (NY), 4364 (NY); Jaraguary, Archer 181 (NY); without precise locality, Moore 475 (NY). MINAS GERAIS: Vicosa, Mexia 4174a (GH), Irwin 2679 (GH), 2050 (US); Uberaba, Regnell 259 (US); Belo Horizonte, Magalhaes (US); without precise locality, Regnell 260 (US), Claussen 69 (NY). PARÁ: Boa Vista on Tapajós River, Dahlgren and Sella 196 (F). PARANÁ: Ponta Grossa, Dusen 2491 (NY); Curitiba, Dusen 2266 (NY). RIO DE JANEIRO: near Rio de Janeiro, Glaziou 18131 (US). RIO GRANDE DO SUL: Santo Ângelo, Lindman 1149 (GH); Montenegro, Rambo 52190 (US). SANTA CATARINA: Canoinhas, Smith and Reitz 8602 (US); Mafra, Smith and Reitz 10671 (US), Reitz 5290 (US); Cacador, Smith and Reitz 11037 (US); Porto Uniao, Smith and Reitz 10831 (US). Without Precise Locality: Macedo 1178 (US), Rambo 51533 (US), Gardner 2475 (GH,NY).

BRITISH GUIANA: Kanuku Mts., Smith 3315a (F,NY,MO); Karenambo, Smith 2251 (F,NY).

COLOMBIA: ANTIOQUIA: Medellin, Toro 778 (NY); Fredonia, Archer 508 (US); San Cristóbal, Barkley, Klare and Antila 2 (US); Dabeiba, Metcalf and Custrecasas 30192 (GH,MO); San Geronimo, Daniel 2279 (NY); Bello, Tomas 581 (US); without precise locality, Tomas 610 (US). ATLÁNTICO: Barranquilla, Elias 1552 (F); Ponedera, Dugard 4706 (US). BOLÍVAR: Boca Verde, Pennell 4221 (NY); Cartagena, Dugand and Jaramillo 3387 (US). CAUCA: Popayán, Cuatrecasas 13853 (NY), Arbeláez and Cuatrecasas 5803 (F); Tambo, Sneidern 416 (F,NY), CUNDINAMARCA: Quetane, Pennell 1866 (GH,NY); Tequedama, Haught 6476 (US); Facatatíva, Arbeláez and Cuatrecasas 5294 (US). MAGDALENA: Santa Marta, Smith 1624 (MO); 2620 (NY), 1624 (NY); El Banco on road to Chimichagua, Haught 2224 (F); Jugua, Haught 3598 (US); Becerril, Haught 3665 (US); Valledupar, Angel 707 (US). META: Villavicencio, Schiefer 722 (GH), Pennell 1383 (US,NY), Haught 2481 (US); Macarena Mts., Idrobo and Schultes 901 (US). NARIÑO: Pasto, Fosberg 21258 (US,NY). NORTE DE SANTANDER: Charta, Killip and Smith 19114 (NY), 19248 (NY); Suratá, Killip and Smith 16839 (NY); Sarare, Cuatrecasas, Schultes and Smith 12177 (F); Cúcuta, Killip and Smith 20993 (GH); Pamplona, Killip and Smith 20553 (GH,NY); Santiago, Molina and Barkley 18NS096 (US), 18NS107 (US). PUTUMAYO: Mocoa, Cuatrecasas 11382A (US). SANTANDER: Bucaramanga, Killip and Smith 16237 (F,NY); El Roble, Killip and Smith 19348 (GH,NY); between Surata and California, Killip and Smith 16839 (GH); Málaga, Cuatrecasas and Barriga 9850 (US,F). TOLIMA: Líbano, Pennell 3324 (GH,NY); Chicoral, Haught 6362 (US); Aquadita, Javier 23 (US).

VALLE DEL CAUCA: Río Sanquininí, Naranjal, Cuatrecasas 15357 (NY); Río Sanquininí, La Laguna, Cuatrecasas 15478 (NY); Potredillo to Miraflores, Pennell and Killip 6066 (NY); Cuchilla, east of Zarzal, Pennell, Killip and Hazen 8527 (NY), Arbeláez and Cuatrecasas 6402 (US). Without Precise Locality: Cuatrecasas 4489 (F), 19474 (GH), Brother Apolinar-Maria 121 (F), Garcia 3046 (US), 4456 (US).

ECUADOR: GALÁPAGOS ISLANDS: Academy Bay, Schimpff 32 (MO); Albemare Island, Villamit, Stewart 1520 (F,MO,NY); Iquana Cove, Snodgrass and Heller 67 (GH), 871 (GH), 91 (GH), Stewart 1522 (GH), Tagus Cove, Snodgrass and Heller 221 (GH), 902 (GH), Howell 9555 (GH), Stewart 1521 (GH); Duncan Island, Stewart 1528 (GH); Indefatigable Island, Svenson 58 (F), 149 (GH), Stewart 1529 (GH), 1531 (GH), 1530 (GH), Howell 9039 (US); Chatham Island, Stewart 1527 (GH), Baur 1 (GH); Charles Island, Baur 2 (GH), Stewart 1525 (GH), 1526 (GH); James Island, Stewart 1532 (GH); Abingdon Island, Snodgrass and Heller 849 (GH). GUAYAS: Guayaquil, Mille 19 (NY); Manglaralto, Svenson 11464 (NY).

PARAGUAY: CAAGUAZÚ: Igatimí, Hassler 5477 (F,NY). CONCEPCIÓN: Concepción, Hassler 7176 (F,NY), 7610 (GH,NY); between Río Aquidabán and Apa, Fiebrig 4568 (GH). CORDILLERA: Altos, Fiebrig 60 (F), Hassler 12623 (GH,MO,NY). FEDERAL DISTRICT: Asunción, Malme 854 (US), Lindman 1069 (US), Burkart 18543 (US). SAN PEDRO. Alto Paraguay, Woolston 1653 (NY). Without Precise Locality: Jörgensen 4131 (F,GH,NY,MO), Morong 815 (F,MO,NY), 829 (F,MO,NY), 729 (GH,MO,NY), Lindman 1903 (NY), Hassler 11895 (GH,MO,NY), 7169 (NY), 4733 (NY), 6198 (NY), 1206 (NY).

PERU: AYACUCHO: Huanta, Killip and Smith 23195 (US,NY). CUZCO: Yanaoca, Macbride 3758 (GH); Quillabamba, Marin 7650 (US). HUÁNUCO: Monzón, Woytkowski 5315 (GH,MO); Pampayacu, Kanehira 83 (GH), Puna, Woytkowski 5193 (GH,MO), 5246 (GH,MO). JUNÍN, Yaupe, Woytkowski 6363 (MO). LAMBAYEQUE: Purculla to Olmos, Woytkowski 6754 (MO). PASCO: Quillasú, Soukup 3312 (US). SAN MARTÍN: San Roque, Williams 7256 (GH), 7375 (GH); Tarapoto, Williams 5546 (GH), Spruce 4409 (NY). Without Precise Locality: Diehl 2448 (GH), Vasgas 2145 (GH), Weberbauer 6702 (GH), 6710 (GH), Cook and Gilbert 1415 (US).

SURINAM: Without Precise Locality: Hostmann 19 (GH,NY), Sagot 18 (NY).

URUGUAY: RIO NEGRO: without precise locality, Herter 1028 (F, MO,NY).

VENEZUELA: ARAGUA: Colonia Tovar, Pittier 9374 (GH,NY). BARINAS: Santa Catalina, Rusby and Squires 138 (F,MO,NY). BOLÍVAR: Alto Caroni, Sta Elena, Lasser 1342 (NY), 1978 (NY); Upata, Steyermark 57696 (F), 57709 (F). CARABOBO: Valencia, d'Heguert 901 (NY); Puerto Cabello, Pittier 8978 (GH,NY), 9143 (GH,NY); Tocuyeto, Saer 901 (US). DISTRICTO FEDERAL: Naiguata, Williams 10139 (F); Caracas, Eggers 13140 (F), Fernández 193 (US); Sanchorquiz, Pittier 9183 (F,NY). FEDERAL DEPENDENCIES: Margarita Island, Miller and Johnston 151 (F), Bernardi 2656 (NY). FALCÓN: Santa Ana, Steyermark and Braun 94616 (NY). LARA: El Tocuyo, Tamayo 2633 (US); Carora, Lasser 1488 (US). MÉRIDA: Mérida, Breteler 3245 (NY); Tovar, Fendler 14 (GH), Pittier 12827 (US,NY); Timótes, Archer 3141 (US). MIRANDA:

Baruba, Williams 10849 (F); Los Teques, Pittier 6119 (US,NY); El Hatillo, Ginés 230 (US). MONAGAS: Barrancas, Tamayo 1577 (F). TACHIRA: Papacho, Archer 3180 (US), 3181 (US). Without Precise Locality: Fendler 13 (F,MO,NY), Broadway 427 (GH,NY), 682 (GH,NY).

BURMA: BURMA: Myitkynia, Belcher 795 (F), 705 (S); Hkamti Plain near Burma-Tibet border, Ward 9044 (F,BM); Mong Wa, Ward 8777 (F); Walkyi, Meebold 17091 (S); Tenasserim, Helfer 84 (S). SOUTHERN SHAN STATES: Valley of Nam-Live, Ward 8877 (NY); Kangtung, Durie s.n. (BM).

CEYLON: Without Precise Locality: Silva 147 (NY), Simpson 8825 (BM), 8455 (BM), Macras 113 (BM).

CHINA: YUNNAN: Manhoa on Red River, Henry 9532 (NY).

INDIA: ASSAM: without precise locality, Jenkens s.n. (NY); Khasi Hills, Hooker and Thomson s.n. (S). BOMBAY: Bassein Fort, Gupta Ua82 (MO); Poona, Roa 84464 (BM). HIMACHAL PRADESH: Chamba, Koelz 8777 (NY). JAMMU AND KASHMIR: Saidpur near Rawalpindi, Stewart 14742A (GH,NY). MADRAS: Cuddapat, Gamble 18236 (BM); Salem, Yeshoda 211 (GH); Kalhatti, Barnes 1015 (GH). PATIALA AND EAST PUNJAB STATES UNION: Dharameala, Ram 328 (NY), Stewart 2107 (GH); Kangra, Koelz 4374 (F,NY); Kulu, Koelz 3136 (NY). PUNJAB: Mandi, Koelz 8324 (GH,NY); Rampur, Parmanand 352 (NY). UTTAR PRADESH: Dehra Dun, Vaid s.n. (NY), Ravzada 90 (NY), Singh 331 (F,NY,S,MO), Choudbury 5 (US); Gorakhpur, Chandi s.n. (US); Almora, Strachey and Winterbottom 1 (GH), 2 (GH,BM); Gonda, Jain 16856 (S). WEST BENGAL: Bengalia near Calcutta, Helfer 38 (NY,B,S). Without Precise Locality: Stewart 951 (GH,MO,S), Choudbury 4 (GH), Biswas 4772 (US), Stewart 16804 (US), Dudgeon and Kenoyer 140 (MO), Stewart 11034 (MO), 21086 (NY), 1024 (S), Koelz 8807 (NY), Samnasena 5 (NY), Kuriakose s.n. (NY), Thomson 268 (BM), Drummond 1220A (S), Hooker and Thomson s.n. (S), 194 (S).

INDONESIA: BORNEO: NORTH BORNEO: Kota Belud, Darnton 95 (F); Mt. Kinabalu, J. and M.S. Clemens 26193 (BM). CELEBES: Kambaena, Elbert 3357 (GH); Manado, Eyma 3504 (GH); without precise locality, Warburg 1888 (NY). SUMBAWA: Sumbawa, Elbert 3960 (GH). WETAR: Elbert 4673 (GH), 4466 (GH), 4687 (GH).

LAOS: Without Precise Locality: Poilane 20540 (B).

NEPAL: Bhim Khola, Stainton, Sykes and Williams 282 (BM); Kali Gandak, Stainton, Sykes and Williams 89 (BM); Kahre, north of Dana, Stainton, Sykes and Williams 632 (BM); Ghanpoklara, Stainton, Sykes and Williams 5140 (BM); Dikhu Khola, Stainton 4544 (BM); Tamur Valley, Stainton 1286 (BM); Trisuli Valley, Lyon 59 (BM); Chillara, Polunin, Sykes and Williams 1957 (BM); Sitalpati, Polunin, Sykes and Williams 1232 (BM).

PAPUA: Wuroi, Brass 5840 (NY,BM,GH).

PHILLIPPINES: LEYTE: Without Precise Locality: Wenzel 1000 (F), 1303 (F,MO). LUZON: BATAAN: Mt. Mariveles, Lamao River, Borden 21736 (US,NY), 2015 (NY,US), Williams 114 (NY); without precise locality, Borden 2016 (F). BATANGAS: without precise locality: Ramos 1837 (BM,MO). BULACAN: Quingua, Vidal 2069 (GH). CAGAYAN: Dalupiri Island, Bartlett 15110 (F). ISABELA: San Mariano, Ramos and Edaño 47071 (S). LAGUNA: Los Blanos, Gates 7173 (F); without

precise locality, McGregor 23059 (US). MANILA: Loher 1980 (US), 1983 (US), Rogerson 1048 (US). MOUNTAIN: Bontoc, Vanoverbergh 3476 (F); Baguio, Williams 1005 (NY). NUEVA ECIJA: Mt. Umingan, Ramos and Edaño 26283 (US). NUEVA VIZCAYA: Dupax, McGregor 14185 (US). PANGASTINAN: Umingan, Merrill 9 (NY,F,MO,BM). RIZAL: Kay Unguian, Bartlett 15377 (GH), Ramos 21339 (US). SORSOGON: Mt. Bulusan, Elmer 15027 (F,US,S,BM,MO); Trosir, Elmer 15027 (NY). Without Precise Locality: Fénix 28076 (F,MO), Loher 1981 (NY). MINDORO: Mt. Yagaw, Conklin 19134 (GH); Abra de Ilog, Sulit 13801 (GH); Mt. Baco, Merrill 1248 (US), 1249 (US); Baco River, McGregor 196 (US,NY). MINDANAO: COTABATO: Quipatag, Añonuevo 13625 (BM). DAVAO: Mati, Ramos and Edaño 48985 (BM); Mt. Mayo, Edaño 11383 (GH); Davao, Copeland 474 (US,NY). LANAO: Lake Lanao, Clemens 36936-2 (US). SURIGAO: Surigao, Ramos and Pascasio 34427 (GH,BM), Wenzel 2818 (GH,MO); without precise locality, Ramos and Pascasio 34622 (US). ZAMBALES: Anuling, Ramos and Edaño 44571 (BM). ZAMBOANGA: Zamboanga, Robinson 11750 (F); Kabasalan, Ebalo 750 (GH); Dikus, Frake 962 (US). PALAWAN: Aborlan, Sulit 12318 (GH); without precise locality, Bermejos 39771 (US), Escritor 21546 (US). PANAY: CAPIZ: Capiz, Ramos and Edaño 31481 (GH). Without Precise Locality: Cuming 619 (BM,GH), 1613 (BM), 1440 (BM,MO,NY), Merrill 228 (NY).

THAILAND: PRACHULAP KHIRI KHAN: Prachuap Khiri Khan, Put 270 (BM). Without Precise Locality: Kerr 6164 (BM).

ANGOLA: LAUNDA: Dalatando, Gossweiler 4420 (BM). Without Precise Locality: Welwitsch 2311 (BM).

COMORO ISLANDS: Without Precise Locality: Humboldt 205 (BM).

ETHIOPIA: GALLA: Ego, Ellenbeck 361 (B).

KENYA: CENTRAL: Kibwezi, Scheffler 147 (BM). COAST: Changamwe near Mombasa, Mearns 2093 (US), 2223 (US), 2293 (US); Tana River, Polhill and Paulo 575 (S). NYANZA: Elgon, Anderson 45 (S).

MADAGASCAR: Amaborano, White s.n. (BM); Betafo, Viguier and Humbert 1403 (B); Moramanga, Afzelius s.n. (S); Majunga, Afzelius s.n. (S); without precise locality; Afzelius s.n. (S), Bojer s.n. (B), Baron 2393 (BM).

MAURITIUS: Without Precise Locality: Ayres s.n. (NY), Bojer s.n. (B).

MOZAMBIQUE: NIASSA: Cabo Delicado, Macondes, Correia 78 (MO). SUL DO SAVE: Massinga, Mondonca 34 (BM).

PORTUGUESE EAST AFRICA: Meringua, Chase 29405 (NY).

RUANDA-URUNDI: Usumbura, Peter 31402 (B), 18539 (B), 18478 (B), 16686 (B), 13226 (B), 39416 (B), 39352 (B), 22174 (B), 20621 (B), 18478 (B).

SOUTHERN RHODESIA: UMTALI: Maranka Reserve, Chase 4762 (MO). Without Precise Locality: Wild 5398 (MO).

TANZANIA: EASTERN: Pangani, Faulkner 675 (S); Morogoro, Schlieben 2888 (S,B); Tanga, Peter 24068 (B), 23800 (B); Lushoto, Drummond and Hensley 2115 (S). NORTHERN: Kilimanjaro, Volkens 1958 (BM). SOUTHERN: Lindi, Carnochan 191 (GH,BM); Hahenge, Schlieben 2271 (B). TANGA: Magogoni, Tanner 3327 (NY); Karoti, Tanner 2938 (NY); Mji Mkuu, Tanner 2070 (NY); Sawa, Faulkner 3631 (S), 3717 (S).

ZANZIBAR: Without Precise Locality: Taylor s.n. (BM).

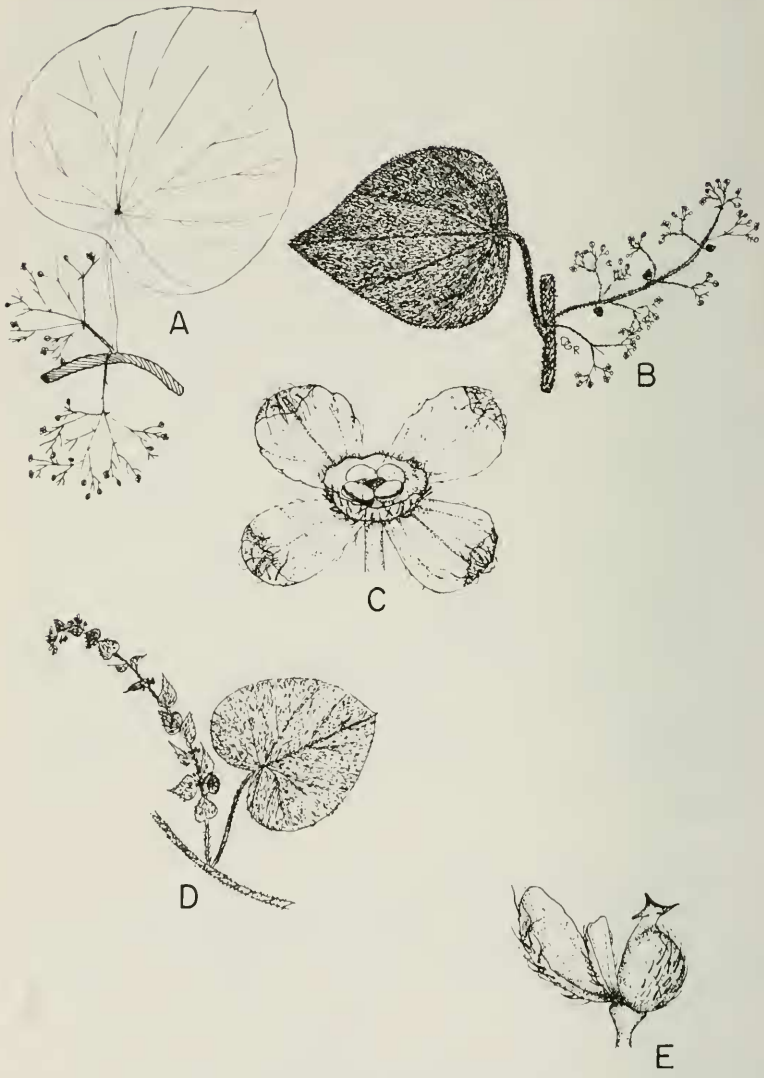


Figure 11. Cissampelos pareira L. A: Cymose staminate inflorescences and glabrous leaf, X 1/2; B: Racemiform staminate inflorescence and pubescent leaf, X 1/2; C: Staminate flower, X 15; D: Pistillate inflorescence and leaf, X 1/2; E: Pistillate flower, X 15.

Cissampelos pareira occurs as a suffrutescent twiner or scrambler and usually is found on hedges, at the forest edge, or in open thickets, although numerous other ecological niches are utilized. Flowering specimens have been collected each month of the year, but the peak period is between January and July.

Venacular names include "peteltum" from Mexico, "alcotan" from Central America, "puro del cura" and "velvet wiss" from the West Indies, and "calaad", "kelulut" or "gleknat" from Asia. Other more widespread venacular names include "false pareira brava", "ice-vine", "portuguese wild olive", "pareira brava", "velvet leaf", and "wild vine".

The heterogeneous nature of the species has led to numerous synonyms. Many of these delimitations were based on isolated collections or fragmentary specimens, but even with adequate material the species presents a difficult task for the taxonomist.

11. Cissampelos mucronata A. Rich. in Guill. and Perr. Fl. Seneg. 11. 1831 (Type: Perrottet 12!) (Figure 12).

Cissampelos aristolochiaefolius Fenzl, in Flora 27:312. 1844 (Type: Kotschy 504).

Cissampelos apiculata Hochst. in Flora 28:93. 1845, ex char. (Type: Krauss 232).

Cissampelos vogelii Miers, in Hook. Fl. Nig. 214. 1849 (Type: Vogel 97).

Cissampelos comata Miers, in Hook. Fl. Nig. 215. 1849, ex char.

Cissampelos macrostachya Klotzsch, in Peters' Reise to Mossamb. 1:174. 1862 (Type: Peters s.n.).

Cissampelos senensis Klotzsch, in Peters' Reise to Mossamb. 1:173. 1862.

Cissampelos zairensis Miers, in Ann. Nat. Hist. ser. 3. 27:180. 1866, nom. nud.; in Contrib. Bot. 3:180. 1871 (Type: Smith s.n.).

Cissampelos pareira L. var. reniformis Welw. ex Hiern. Cat. Afr. Pl. Welwitsch 1:19. 1896 (Type: Welwitsch 2314).

Cissampelos pareira L. var. deglabrescens Welw. ex Hiern. Cat. Afr. Pl. Welwitsch 1:19. 1896 (Type: Welwitsch 2312).

Cissampelos pareira L. var. mucronata Dur. and Schinz, in Consp. Fl. Afr. 1. 2:51. 1898.

Cissampelos pareira L. var. macrostachya Dur. and Schinz, in Consp. Fl. Afr. 1. 2:51. 1898.

Cissampelos pareira L. var. senensis Dur. and Schinz, in Consp. Fl. Afr. 1. 2:51. 1898.

Cissampelos pareira L. var. zairensis Dur. and Schinz, in Consp. Fl. Afr. 1. 2:52. 1898.

Cissampelos pareira L. var. pachyphylla Diels, in Engl. Pflanzen. 4(94):301. 1910.

Suffrutescent twiners to 2 m; stems striate, pilose to tomentose. Leaves petiolate, basifixed or obscurely peltate, broadly ovate to cordate, rarely suborbicular or reniform, entire, the apex acute to obtuse, rarely rounded or emarginate, mucronate, the base cordate to truncate, (2.0-)5.8(-10.0) cm long, (2.5-)5.4 (-8.5) cm wide, membranous to subcoriaceous, palmately 5- to 7-nerved, puberulent to pilose above, rarely glabrous, paler below and densely pilose to tomentose; petioles (1.0-)2.5(-5.5) cm long, tomentose or rarely pilose. Staminate inflorescence multi-flowered fasciculate dichasia arranged in an ebracteate racemiform manner to 30 cm in length or as cymose clusters axillary from normal leaves or rarely cymose clusters within the axils of reduced leaves or bracts of secondary axillary branches; 1-4 dichasia per fascicle; peduncle of cymes at length 1 cm long, tomentose; bracts of secondary branches basifixed, petiolate to 3 mm, broadly ovate to cordate, entire, 6-12 mm long, 4-12 mm wide, membranous, pilose above, densely pilose below; bracteoles linear, about 0.5 mm long, pilose. Staminate flowers pale yellow or whitish: sepals 4, rarely 5, obovate or rarely elliptic, (0.9-)1.3(-1.5) mm long, (0.5-)0.7 (-1.0) mm wide, exteriorly pilose; corolla cupuliform, 0.5 mm high, 1.0 mm in diameter, or patelliform, (0.6-)0.9(-1.2) mm in diameter, rarely 2-lobed, glabrous or the exterior sometimes puberulent; synandrium sessile to 0.1 mm high, anthers (6-)8(-9), glabrous. Pistillate inflorescence composed of individual flowers fasciculate in the axils of bracts upon racemiform secondary axillary branches to 18 cm; 5-12 flowers per fascicle; bracts basifixed, sessile or petiolate to 3 mm, ovate to reniform, entire, mucronate, (3-)10.3 (-18) mm long, (3-)10.9(-21) mm wide, membranous, pilose above, densely pilose below. Pistillate flowers: sepal 1, obovate, (1.1-) 1.4(-1.7) mm long, (0.7-)0.9(-1.0) mm wide, exteriorly pilose; petal 1, broadly ovate, suborbicular, reniform or deltoid, (0.5-)0.6(-0.7) mm long, (0.6-)0.8(-1.0) mm wide, glabrous or the exterior puberulent to pilose; carpel 1, slightly gibbose, (0.5-)0.9(-1.2) mm long, sessile, pilose, rarely glabrous; stigma 5-lobed or the lobes quite reduced. Drupe obovoid, (4-)4.3(-6) mm long, (3-)3.5(-5) mm wide, puberulent to pilose; fruiting stalk (1-)1.5(-3) mm long.

Africa.

ANGOLA: BENGUELA: Benguela, Anchieta 81 (BM). Without Precise Locality: Gossweiler 2330 (MO).

BELGIAN CONGO: KATANGA: Baudouinville, Robyns 2257 (MO). KIVU: Kabare, Troupin 5552 (NY); without precise locality, Humbert 8187 (B). Without Precise Locality: Michel and Reed 423 (MO), Germain 3288 (MO), Louis 4886 (BM).

FRENCH WEST AFRICA: SENEGAL: Dakar, Baldwin 5747 (US); without precise locality, Sieber 39 (S). SOUDAN: Koutiala, Roberty 13342 (MO).

KENYA: Nairobi, Dummer 1789 (BM).

NIGERIA: NORTHERN: Abinsi, Dalziel s.n. (MO,BM).

MOZAMBIQUE: MANICA E SOFALA: Chimoio, Mendonca 265 (BM); without precise locality, Torre and Paiva 9070 (MO). ZAMBEZIA: Mocuba, Faulkner 300 (S). Without Precise Locality: Thompson 5 (MO), Chase 2781 (MO).

RHODESIA AND NYASALAND: NORTHERN RHODESIA: Namwala, White 2980 (MO); Mwinilunga, Milne-Redhead 2826 (BM); Ndola, Angus 916 (MO,BM); Barotse, Codd 7449 (BM); Kalomo, Rogers 26011 (S). NYASALAND: Bandawe, Jackson 998 (BM); Zomba, Whyte s.n. (GH,NY); Mwanza River, Brass 17997 (US,MO,NY), 18011 (US,MO,NY); Karonga, Whyte 325 (US); Kyimbila, Stolz 382 (US,BM,S,MO); without precise locality, Stolz 1871 (MO,B,S), Buchanan 115 (US,BM), 153 (BM). SOUTHERN RHODESIA: Shangani, Goldsmith 81/56 (S); Victoria, Monro 1344 (BM), 1352 (BM); Umtali, Fries, Norlindh and Weimarck 2921 (BM,S), Chase 123 (BM); Nakomi, Fries, Norlindh and Weimarck 3338 (S), 3389 (BM,S), 3279 (BM,S); Matopos, Gibbs 243 (BM), Wall s.n. (S); Salisbury, Godman 161 (BM), Lyles 1878 (MO); Sinoia, Rand 310 (BM); Nyamandhlovu, Plowes 1750 (S); Ndanga, Goodier 31 (MO); Que Que, Biegel 502 (MO); Chipinga, Soane 271 (MO); Zimbabwe, Leach and Chase 10568 (MO,BM); Kondoa Irangi, Burtt 703 (MO).

RUANDA-URUNDI: Usumbura, Peter 3885d (B); Biumba, Troupin II.731 (GH,MO), II.763 (GH,MO), 8012 (NY), 8063 (NY).

SOUTHWEST AFRICA: Lisikili, Codd 7105 (BM); without precise locality, Dinter 5257 (GH).

TANZANIA: Tanga, Peter 24870 (B); Ujiji, Peter 36879 (B); Pare, Peter 10777 (B), 14252 (B); Mahenge, Schlieben 2271 (S,BM); Lindi, Carnochan 191 (GH); Mpanda, Jefford and Juniper 21 (MO); Kigoma, Newbould and Harley 4332 (MO), 4330 (MO); Bwiru, Tanner 671 (NY); Ulugurus, Bruce 1053 (BM).

TOGO: Without Precise Locality: Warneke 263 (B,BM), 338 (BM).

UGANDA: Entebbe, Mearns 2579 (US); Tororo, Bagshawe 1246 (US); Kibwezi, Scheffler 147 (S); Bunvoro, Taylor 3346 (S); Kampala, Wall s.n. (S); Ruwenzari Mt., Elliot 8399 (BM), 7321 (BM); without precise locality, Dummer 282 (US,MO).

UNION OF SOUTH AFRICA: TRANSVAAL: Pietersburg, Rogers and Moss 59 (US); Barberton, Stolz 1841 (MO,BM), Rogers 18224 (S). CAPE OR GOOD HOPE: Capetown, Bolus 7634 (MO). NATAL: Hlabisa, Wells 2114 (MO); Port Natal, Krauss 232 (MO). Without Precise Locality; Schlechter 3071 (BM,S), Wood 632 (BM).

ZANZIBAR: Kisimbani, Faulkner 3123 (S).

Cissampelos mucronata is collected often in open areas, sometimes in association with termite mounds.

The species is known as "chipomba-folia" in Mozambique, "umuhanda" in Ruanda-Urundi, and "chilambe" in Nyasaland.

The most distinguishing characters include the extensive amount of pubescence on the foliage, the eight anthers present in the staminate flower, and the five lobed stigma of the pistillate flower.

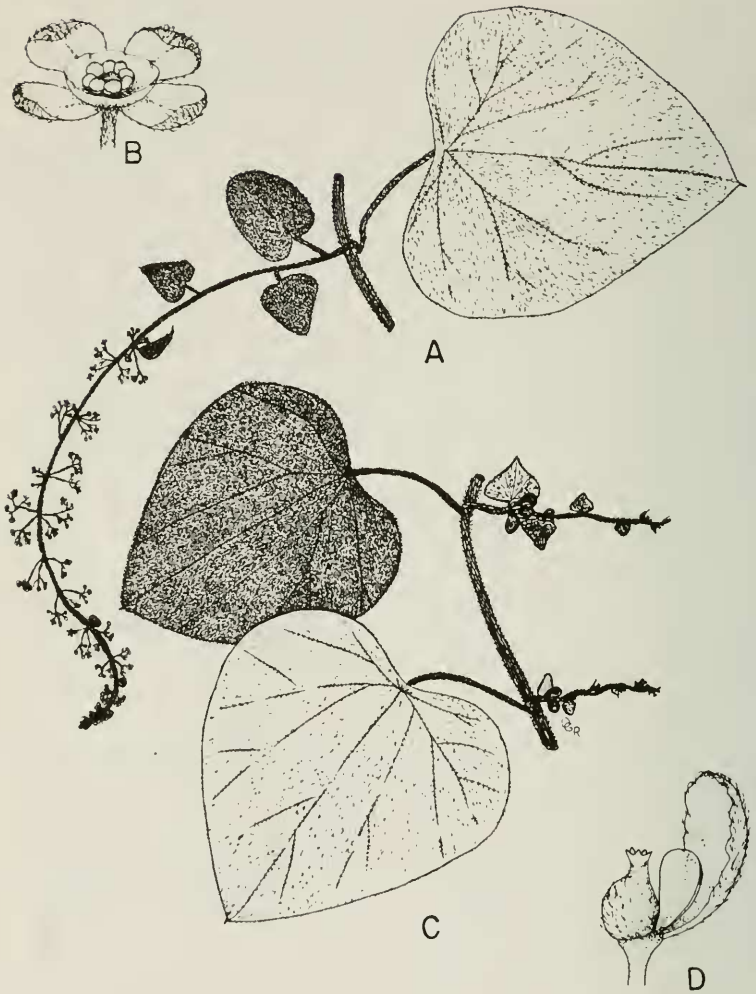


Figure 12. Cissampelos mucronata A. Rich. A: Staminate inflorescence and leaf, X ½; B: Staminate flower, X 15; C: Pistillate inflorescences and leaves, X ½; D: Pistillate flower, X 15.

12. Cissampelos tenuipes Engl. in Bot. Jahrb. 26:399. 1899 (Type: Pogge 618!) (Figure 13).

Twiners, sometimes rooting at the nodes; stems striate, glabrous. Leaves petiolate, peltate to 14 mm, suborbicular, the apex rounded, frequently emarginate, mucronate, the base truncate to slightly rounded, 2.5-7.5 cm long, 4.0-10.5 cm wide, membranous, palmately 10- to 12-nerved, prominent below, glabrous, paler below and sometimes glaucous; petioles 4-8 cm long, glabrous. Staminate inflorescence not seen. Pistillate inflorescence a racemiform secondary branch; bracts basifixed, sessile, suborbicular, entire, mucronate, at length 1.8 cm long, 2.0 cm wide, membranous, glabrous. Pistillate flowers not seen. Drupe red, obovoid, conspicuously ridged, 5 mm long, 4 mm wide, glabrous.

Africa.

BELGIAN CONGO: KATANGA: Lulua River, Pogge 618 (B). Without Precise Locality: Callens 3477 (BM).

A species which is distinguished by the glabrous and conspicuously peltate leaves.

13. Cissampelos owariensis P. Beauv. ex DC. Prodr. 1:100. 1824 (Type: Beauvois s.n.!) (Figure 14).

Cissampelos insolita Miers, in Ann. Nat. Hist. ser. 3. 27:136. 1866, nom. nud.; in Contrib. Bot. 3:179. 1871 (Type: Mann 1870).

Cissampelos hirta Miers, in Ann. Nat. Hist. ser. 3. 27:136. 1866, nom. nud.; in Contrib. Bot. 3:179. 1871 (Type: Smith s.n.).

Cissampelos pareira L. var. owariensis (Beauv.) Oliv. in Fl. Trop. Afr. 1:46. 1868.

Cissampelos owariensis Beauv. var. asperifolia Welw. msc. ex Hiern, Cat. Afr. Pl. Welw. 1:19. 1896 (Type: Welwitsch 2313).

Cissampelos macrosepala Diels, in Bot. Jahrb. 43:326. 1909 (Types: Mildbraed 2952, 2990).

Cissampelos insignis Alston, in Kew Bull. 362. 1925 (Type: Stolz 1600!).

Cissampelos robertsonii Exell, in Journ. Bot. 64:192-193. 1926. (Type: Robertson 27).

Suffrutescent twiners; stems striate, glabrous to pilose or sometimes sericeous. Leaves petiolate, conspicuously peltate to 17 mm, ovate to suborbicular, frequently obscurely 3-lobed, entire to undulate, the apex acuminate to obtuse, rarely emarginate or

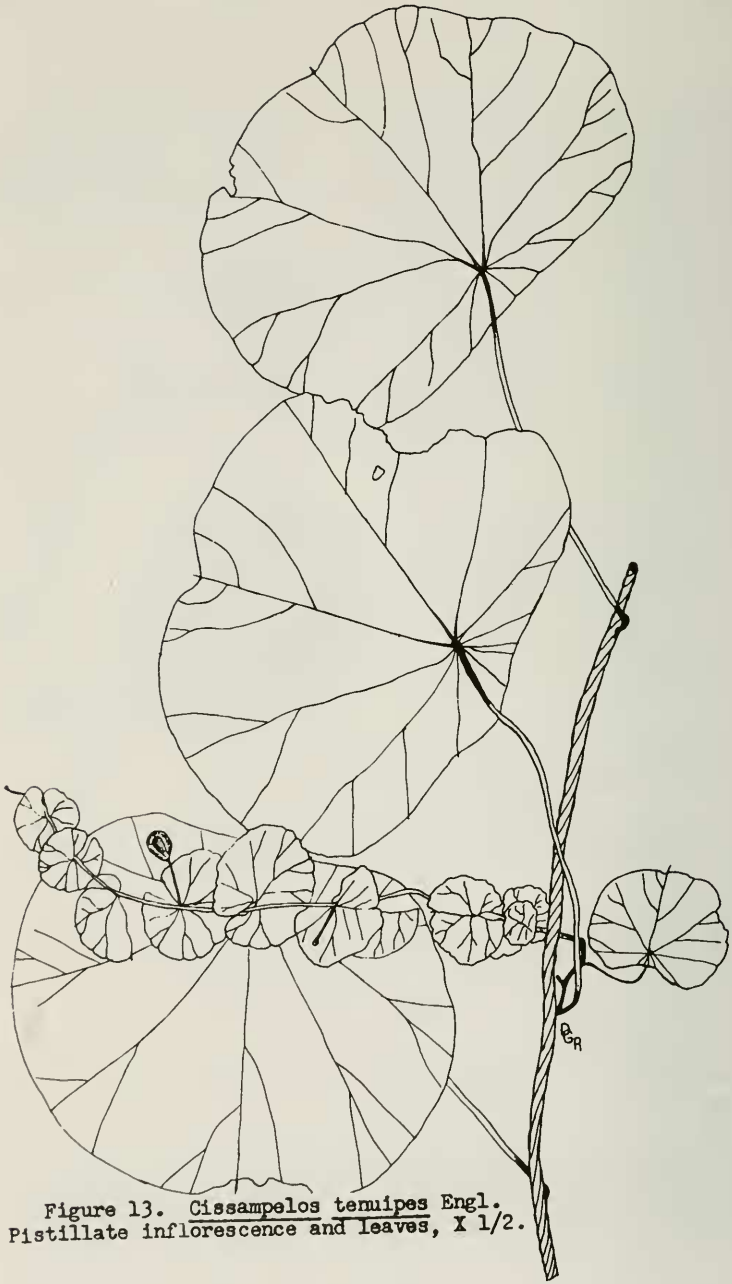


Figure 13. Cissampelos temuipes Engl. Pistillate inflorescence and leaves, X 1/2.

rounded, the base truncate to rounded, rarely retuse, (4.0-)8.0(-14.5) cm long, (3.3-)8.2(-17.0) cm wide, palmately 10- to 12-nerved, prominent below, glabrous to pilose above, pilose below; petioles (2.5-)7.7(-11.0) cm long, puberulent or tomentose distally and proximally. Staminate inflorescence multi-flowered fasciculate dichasia arranged in ebracteate racemiform manner to 15 cm in length or as cymose clusters axillary from normal leaves or rarely as cymose clusters within the axils of reduced leaves of secondary axillary branches; 1-4 dichasia per fascicle; peduncle or cymes at length 1 cm long, pilose. Staminate flowers whitish; sepals 4, elliptic to obovate, (1.1-)1.7(-2.8) mm long, (0.7-)0.9(-1.1) mm wide, puberulent to pilose exteriorly; corolla cupuliform and frequently dentate, (0.9-)1.0(-1.2)mm high, (0.7-)1.0(-1.2) mm in diameter, or patelliform, (0.9-)1.0(-1.1) mm in diameter, glabrous or rarely puberulent exteriorly; synandrium sessile to 1.2 mm in height, anthers 4, glabrous. Pistillate inflorescence composed of individual flowers fasciculate in the axils of bracts upon racemiform or paniculiform secondary axillary branches to 30 cm; about 6 flowers per fascicle; bracts basifixed, minute to large and foliaceous, at length 22 mm long and wide, sessile or petiolate to 4 mm long, reniform, rarely broadly ovate, entire to undulate, mucronate, membranous, puberulent to pilose with the margin frequently ciliate. Pistillate flowers: sepal 1, lanceolate to obovate, (1.6-)1.8(-2.8)mm long, (0.7-)0.8(-1.0) mm wide, the exterior puberulent to pilose; petal 1, reniform to quadrangular, (0.7-)0.8(-0.9) mm long, (0.6-)0.9(-1.1) mm wide, glabrous or exteriorly puberulent; carpel 1, gibbose, (0.7-)1.0(-1.2) mm long, sessile, puberulent to pilose; stigma 3-lobed. Drupe obovoid, 4 mm long, 3 mm wide, puberulent to pilose; fruiting stalk 3 mm long.

Africa.

ANGOLA: Without Preicse Locality: Gossweiler 4436 (BM), 9273 (BM), 4437 (BM), 5427 (BM), 4440 (BM), 4429 (BM), 5603 (BM), Nolde 361 (BM), Welwitsch 2318 (B).

BELGIAN CONGO: EQUATEUR: Bikoro, Leonard 617 (US,MO); Eala, Louis 2190 (S), Lebrun 1236 (S). KATANGA: Elisabethville, Luarre 4440 (S); Luapula River, Kassner 2435 (BM). KIVU: Kabambare, Troupin 5571 (NY). LEOPOLDVILLE: Matadi, Dacremont 223 (MO). ORIENTALE: Lubutu, Linder 1786 (GH); Euplu, Putman 209 (GH); Yangambi, Louis 2357 (BM), 4108 (F), 1337 (F), 1858 (F), 12451 (US,MO), 14591 (US,MO), Troupin 2083 (BM,S), 7952 (S), Gilbert 205 (MO); Bambesa, Louis 1701 (US,MO); Buta, Lebrun 2533 (MO). Without Precise Locality: Robyns 1153 (MO), Louis 1345 (MO), Michel and Reed 866 (MO), Lebrun 1056 (MO).

CAMEROUN: Without Precise Locality, Gocker 87 (GH), Zenker 119 (GH,B), 1243 (S), 2357 (BM,S), 3137 (BM,S), 3015a (NY,BM,S), Staudt 17 (S), Jungner 24 (S), Dusen 82 (S).

FRENCH WEST AFRICA: DAHOMEY: Without precise locality, Poisson B.2-78 (GH). GABON: Without precise locality, Loyaux 368 (B).

NIGERIA: Eket District, Talbot s.n. (BM); Oban, Talbot 1257 (BM).

RHODESIA AND NYASALAND: NORTHERN RHODESIA: South Down, Linley 71 (MO); Mwinilunga, Milne-Redhead 3678 (BM). NYASALAND: Kyimbila,

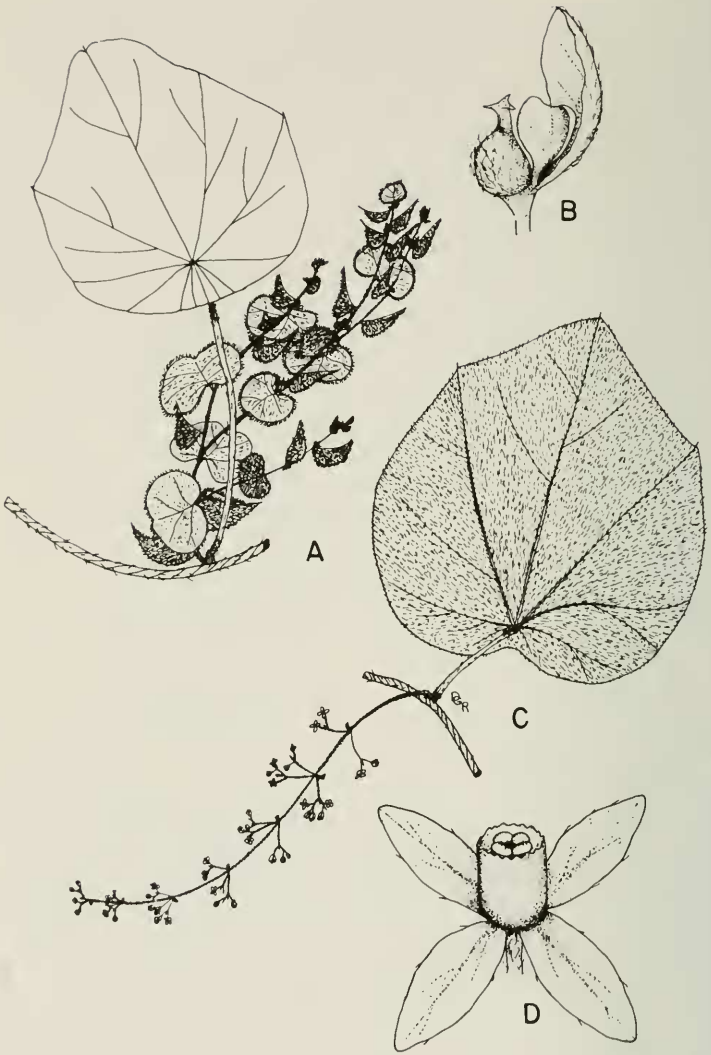


Figure 14. Cissampelos owariensis Beauv. A: Pistillate inflorescence and leaf, X 1/2; B: Pistillate flower, X 15; C: Staminate inflorescence and leaf, X 1/2; D: Staminate flower, X 15.

Stolz 737 (B,S).

RUANDA-URUNDI: without precise locality, Peter 36565 (B), 38859 (B), Busse 1099 (B).

TANZANIA: Masagati, Schlieben 1096 (BM,B,S): north of Lake Nyasa, Stolz 1600 (GH,MO,BM); Lindi, Schlieben 5913 (S,B); Morogorao, Verschueren 666 (US).

Cissampelos owariensis is distinguished by the large suborbicular leaves which are obscurely three-lobed, the large pistillate and staminate flowers compared to other species of Cissampelos, and the dentate, cupuliform corolla of the staminate flower.

14. Cissampelos rigidifolia (Engl.) Diels, in Engl. Pflanzen. 4(94):303. 1910 (Type: Schweinfurth 3688ð!) (Figure 15).

Cissampelos pareira L. var. transitoria Engl. subvar. rigidifolia Engl. in Engl. Bot. Jahrb. 26:395. 1899.

Cissampelos owariensis sensu Troupin, in Fl. Congo Belge et Ruanda-Urundi. 2:249. 1951.

Cissampelos rigidifolia (Engl.) Diels var. lanuginosa Troupin, in Bull. Jard. Bot. Brux. 25:141. 1955 (Type: Schieben 5913b).

Twiners; stem striate, young stems puberulent to pilose. Leaves petiolate, peltate to 4 mm, cordate, entire, the apex acute to obtuse, mucronate, the base retuse to cordate, 5.0-7.5 cm long, 5.5-7.5 cm wide, subcoriaceous, palmately 9- to 12-nerved, usually prominent below, glabrous to puberulent above, paler below and densely pilose; petioles 1.2-3.5 cm long, pilose to tomentose. Staminate inflorescence multi-flowered fasciculate dichasia arranged on bracteate paniculiform axillary branches to 28 cm; 3-5 dichasia per fascicle; peduncle of cymes at length 2 cm long, rigid, tomentose; bracts of secondary branches scattered, basifixed, sessile or petiolate to 2 mm, cordate, mucronate, entire, at length 5 mm long and wide, membranous, pilose; bracteoles linear, about 1 mm long, pilose. Staminate flowers; sepals 4, elliptic to obovate, 1.2-1.5 mm long, 0.5-0.7 mm wide, exteriorly pilose; corolla patelliform, 0.8 mm in diameter, pilose exteriorly; synandrium 0.5 mm long, anthers 4, glabrous. Pistillate inflorescence composed of 5-7 individual flowers fasciculate on bracteate, paniculiform secondary branches; bracts basifixed, sessile or petiolate to 2 mm, reniform, entire, mucronate, at length 1.5 cm long, 1.6 cm wide, membranous, pilose, the margins densely ciliate with yellowish hairs. Pistillate flowers: sepal 1, elliptic to obovate, 1.3-1.5 mm long, 0.5-0.8 mm wide, exteriorly pilose, petal 1, rarely 2, sometimes bilobed, obovate to deltoid, 0.4-0.6 mm long, 0.4-0.7 mm wide, exteriorly pilose; carpel 1, gibbose, 0.4-0.6 mm long, pilose. Drupe obovoid, 4-5 mm long, 3-4 mm wide, pilose; fruiting stalk 3-4 mm long.

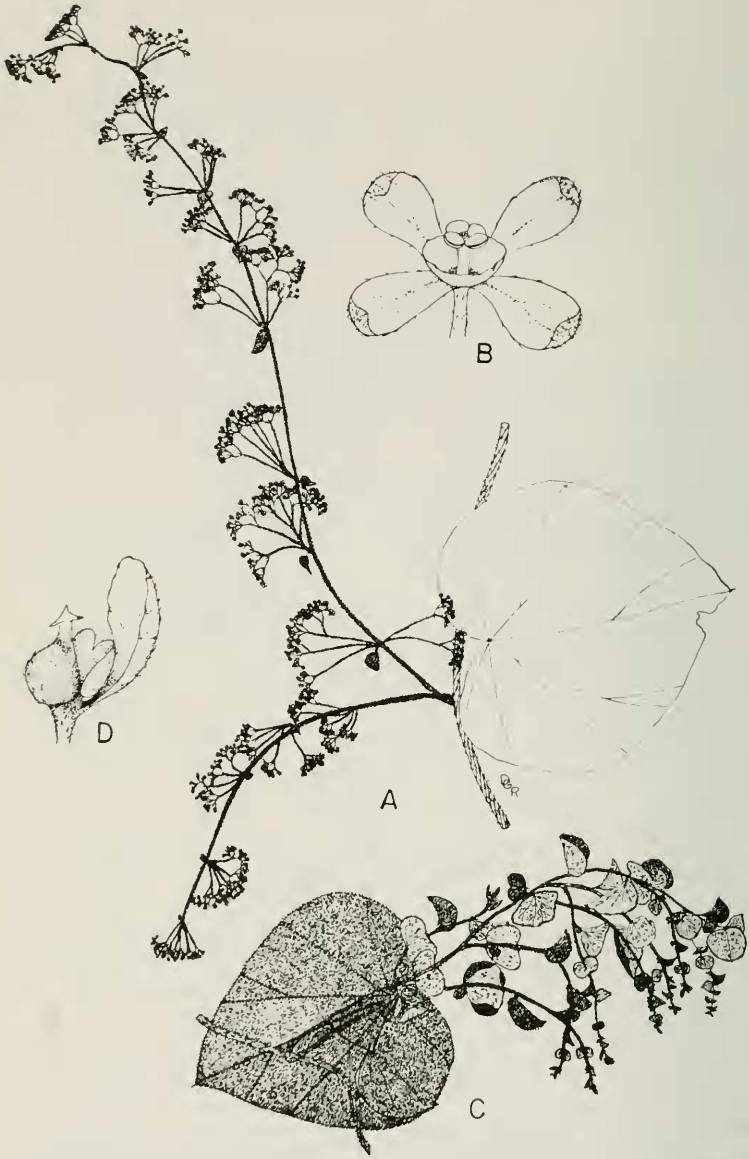


Figure 15. Cissampelos rigidifolia (Engl.) Diels. A: Staminate inflorescence and leaf, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescence and leaf, X 1/2; D: Pistillate flower, X 15.

Central Africa.

SUDAN: EQUATORIA: Nambambisso, Schweinfurth 3688 (B); Niamniam, Schweinfurth ser. III, 78 (B); Tambura, Wyld 145 (B).

A species which is distinguished by the paniculiform pistillate and staminate inflorescences.

The type for Cissampelos rigidifolia is the staminate collection of Schweinfurth 3688 (B). A pistillate collection from the type locale also numbered Schweinfurth 3688 and labeled in the Berlin collection as an isotype is a specimen of C. owariensis.

15. Cissampelos torulosa E. Mey. ex Harv. Fl. Capens. 1:11. 1859. (Type: Drege 3392) (Figure 16).

Menispermum capense Thunb. Fl. Cap. ed. Schultes. 402. 1823, ex char.

Cissampelos wildemaniana Bossche, in Pl. Nov. Herb. Hort. Then. 1:5. 1904 (Type: Luja 473).

Cissampelos truncata Engl. in Engl. Bot. Jahrb. 26:398. 1899 (Type: Stuhlmann 8831!).

Twiners, stems striate, young stems glabrous to pilose. Leaves petiolate, basifixed, reniform to deltoid, entire to undulate, the apex obtuse to rounded, rarely emarginate, mucronate, the base cordate to truncate, 1.8-6.0 cm long, 2.7-6.5 cm wide, subcoriaceous, palmately 3- to 5-nerved, glabrous to rarely pilose with tuft of hairs at petiole attachment; petioles 1.5-4.0 cm long, glabrous to pilose. Staminate inflorescence multi-flowered fasciculate dichasia as cymose clusters axillary from the leaves or rarely from reduced leaves or secondary axillary branches to 8 cm; 1-2 dichasia per fascicle; peduncle or cymes at length 3 cm long, glabrous or puberulent; bracteoles about 1 mm long. Staminate flowers greenish-yellow: sepals 4, elliptic to obovate, 0.7-1.1 mm long, 0.5-1.0 mm wide, glabrous; corolla cupuliform, rarely patelliform or lobed, 0.4-0.5 mm in height, glabrous; synandrium 0.3-1.0 mm in height, anthers 4, rarely 5, glabrous. Pistillate inflorescence composed of 3-4 individual flowers fasciculate on bracteate racemiform secondary branches to 10 cm in length or from reduced leaves of secondary branches; bracts sessile, reniform, entire, mucronate, 4 mm long and wide, membranous, puberulent. Pistillate flowers: sepal 1, rhomboidal, 1.1 mm long, 1.0 mm wide, glabrous; petal 1, suborbicular, 0.5 mm long, 0.7 mm wide, glabrous; carpel 1, gibbose, 0.7 mm long, glabrous; pedicellate to 3 mm. Drupe obovoid, 4 mm long and wide, glabrous; fruiting stalk 6-8 mm long.

Africa.

MOZAMBIQUE: LOURENCO MARQUES: Lourenco Marques, Howard 23 (US). SUL DO SAVE: between Morrumbene and Massinga, Exell, Mendonca and Wild 656 (BM).

RHODESIA AND NYASALAND: NORTHERN RHODESIA: Nyika Plateau, Robson 414 (BM). NYASALAND: without precise locality, Robson 1367 (BM).

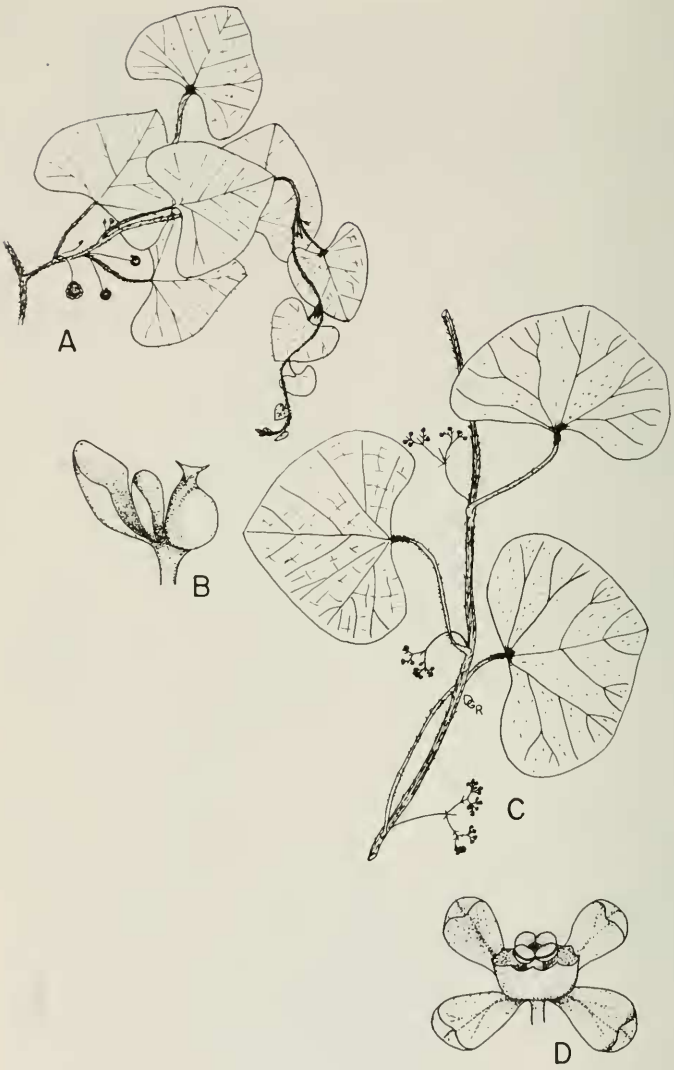


Figure 16. Cissampelos torulosa E. Mey. A: Pistillate inflorescence, X 1/2; B: Pistillate flower, X 15; C: Staminate inflorescence and leaves, X 1/2; D: Staminate flower, X 15.

SOUTHERN RHODESIA: Inyanga, Plowes 2100 (MO), Fries, Norlindh and Weimarck 3873 (S); Chirinda, Chaje 444 (MO); Umtali, Exell, Mendonca and Wild 154 (BM); Gwanda, Wild 2230 (S).

TANZANIA: Uluguru Mts., Stuhlmann 8831 (B), Bruce 74 (BM), Schlieben 2699 (S); Usambara Mts., Peter 18232 (B), 17530 (B), 17454 (B), O.I. 101 (B), 16125 (B), 3256 (B), 10022 (B); Amani, Peter 23646 (B), 16914 (B); Monga, Peter 19045 (B); Lushoto, Drummond and Hemsley 2157 (S).

UNION OF SOUTH AFRICA: CAPE OF GOOD HOPE: Montagu-Pass, Rehmann 275 (BM); Uitenhage, Burchell 4659 (GH); between Keiskamma and Buffelrivier, Drege s.n. (S). NATAL: Durban, Wood 5962 (F,BM,MO) Alexandra District, Rudatis 1234 (US); Zululand, Gerrard 355 (BM); Claremont, Schlechter 2841 (S); without precise locality, Schlechter 2841 (GH,BM). TRANSVAAL: Louis Trichardt, Schlieben 7598 (F,NY); Houtbosh, Rehmann 5956 (BM). Without Precise Locality: Cooper 120 (BM).

Cissampelos torulosa is characterized by the usually deltoid leaves which possess a tuft of hairs at the junction of the petiole and lamina as well as the staminate flower which often has the corolla lobed or parted.

Diels (1910) separates Cissampelos truncata as a distinct species on the basis of a five to eight locular synandrium and a truncate leaf base, but these characters are not stable enough to warrant species delimitation.

16. Cissampelos nepalensis Rhodes, sp. nov. (Type: Nicolson 3121!) (Figure 17).

Plantae volubiles; caules striati, puberuli, Folia petiolata, basifixa, late ovata usque obscure cordata, undulata, apex obtusus mucronatus, basis truncata vel retusa, 4.5-5.5 cm longa, 4.0-4.9 cm lata, membranacea, palmatim 5-7 nervata, puberula, venae totae cristis phelloideis; petioli 3.0 cm longi, pilosi sed tomentosi distaliter et proximaliter. Inflorescentia staminata dichasia multi-flora fasciculata disposita atque fascicali corymbosi intra axillas in foliorum reductorum vel bractearum in ramis racemiformibus secundariis usque 14 cm, dichasia 2-3 per fasciculum; pedunculi in cymarum demum 3 cm longi, pilosi; bracteolae circa 1 mm longae, pilosae. Flores staminati virelli; sepala 4, obovata, 0.6-0.8 mm longa, 0.4-0.5 mm lata, extus puberula, intus glabra cristis phelloideis secus venas; corolla plus minusve cupulata, 0.5 mm in diametro, 0.2 mm in alt, glabra; synandrium pedicellatum usque 0.5 mm longum, antherae 4, glabrae. Flos pistillatus ignotus.

Central Asia.

NEPAL: ILAM: Mechi, Nicolson 3121 (US). KAILALI AND KANCHANPUR: Seti, Nicolson 2786 (US). POKHARA: Gandaki, Nicolson 2893 (US).

Cissampelos nepalensis is distinguished by the essentially glabrous staminate flowers and the phelloid ridges which occur along the veins of the leaves and sepals.

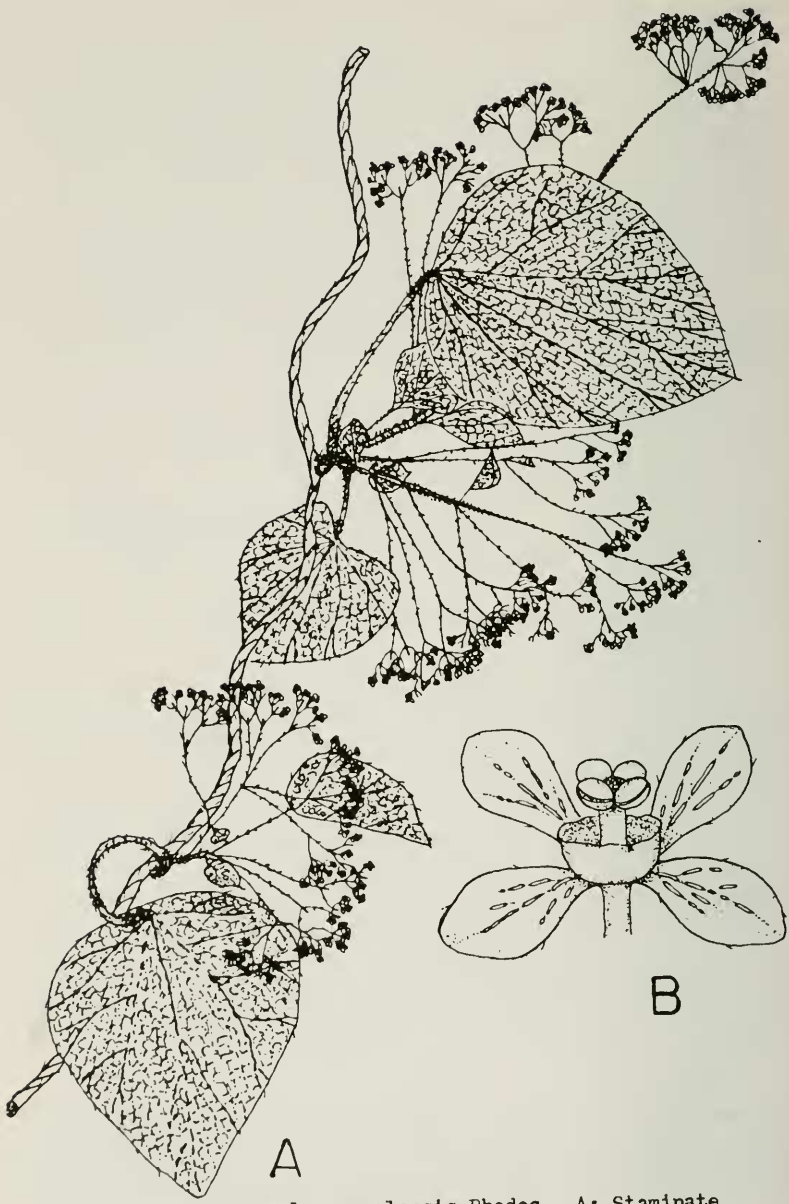


Figure 17. Cissampelos nepalensis Rhodes. A: Staminate inflorescences and leaves, X 1; B: Staminate flower, X 30.

17. Cissampelos friesiorum Diels, in Bot. Gar. Mus. Berlin Not. 8:477. 1923 (Type: Fries 1625!) (Figure 18).

Twiners; stems striate, young stems sericeous. Leaves petiolate, peltate to 3 mm, ovate, undulate, the apex acuminate to acute, mucronate, the base rounded, 5.5-7.0 cm long, 3.5-5.0 cm wide, membranous, palmately 5- to 7-nerved, slightly sericeous above, paler below and densely sericeous; petioles 2-3 cm long, sericeous. Staminate inflorescence multi-flowered fasciculate dichasia arranged as cymose clusters axillary from normal leaves; 2-3 dichasia per fascicle; peduncle of cymes at length 1 cm, pilose. Staminate flowers: sepals 4, elliptic to obovate, 1.1-1.4 mm long, 0.8-1.0 mm wide, exteriorly pilose; corolla cupulate, 0.5-0.8 mm in height, 0.8-1.0 mm in diameter, exteriorly pilose; synandrium 0.5-0.8 mm long, anthers 4, glabrous. Pistillate inflorescence not seen.

East Africa.

KENYA: Meru, Fries 1625 (S).

A specimen from the Berlin Museum is labeled as an isotype, but apparently there was an error in the label preparation as it is numbered Fries 1635.

Cissampelos friesiorum is distinguished by the densely sericeous character of the vegetation.

18. Cissampelos hirta Klotzsch, in Peters' Reise Nach Mossamb. 1:174. 1862 (Type: Peters s.n.!) (Figure 19).

Cissampelos tamnifolia Miers, in Ann. Nat. Hist. ser. 3. 27:137. 1866, nom. nud.; in Contrib. Bot. 3:185. 1871. (Type: Forbes 11).

Cissampelos pareira L. var. hirta Dur. and Schinz, in Consp. Fl. Afr. 1(2):51. 1898.

Cissampelos pareira L. var. klotzschii Dur. and Schinz, in Consp. Fl. Afr. 1(2):51. 1898.

Cissampelos pareira L. var. mucronata (A. Rich.) Engl. subvar. hirta (Klotzsch) Engl. in Bot. Jahrb. 26:395. 1899.

Twiners; stem striate, young stems glabrous to pilose. Leaves petiolate, basifixed or rarely peltate to 2 mm, reniform to deltoid, entire to crenate, the apex acute to rounded, sometimes emarginate, mucronate, the base retuse to cordate, rarely truncate, 2.5-7.5 cm long, 3.5-7.5 cm wide, subcoriaceous, palmately 5- to 7-nerved, usually prominent below, glabrous to puberulent, paler below; petioles 1.3-4.5 cm long, glabrous to pilose. Staminate inflorescence multi-flowered fasciculate dichasia arranged as cymose clusters axillary from normal leaves or upon secondary ebracteate racemiform axillary branches to 6 cm; 1-4 dichasia per fascicle; peduncle of cymes at length 3.5 cm long, glabrous. Staminate flowers: sepals 4,

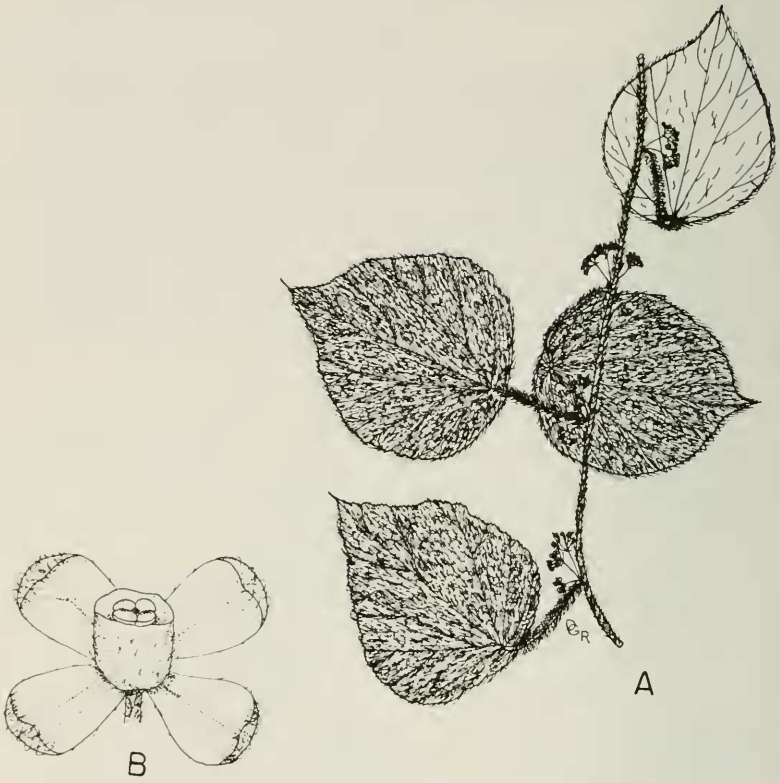


Figure 18. Cissampelos friesiorum Diels. A: staminate inflorescences and leaves, X ⅔; B: staminate flower, X 15.

elliptic, 0.8-1.0 mm long, 0.5-0.7 mm wide, glabrous; corolla patelliform, 0.6-0.8 mm in diameter, essentially glabrous; synandrium sessile to 0.2 mm in height, anthers 4, glabrous. Pistillate inflorescence composed of 3-7 individual flowers fasciculate on bracteate racemiform secondary branches; bracts basifixed, sessile or petiolate to 1 mm, broadly ovate, cordate or reniform, frequently large and foliaceous, entire, mucronate, at length 1.6 cm long, 2.3 cm wide, frequently grading to minute, membranous, glabrous to pilose. Pistillate flowers: sepal 1, elliptic to obovate, 0.6-0.8 mm long, 0.4-0.5 mm wide, glabrous, involute and somewhat carnose; petal 1, obovate to deltoid, 0.3-0.5 mm long, 0.3-0.6 mm wide, glabrous, somewhat involute; carpel 1, gibbose, 0.5-0.8 mm long, glabrous. Drupe red, obovoid, 4-5 mm long, 4-5 mm wide, glabrous; fruiting stalk 1-3 mm long.

South Africa.

MOZAMBIQUE: LOURENCO MARQUES: Lourenco Marques, Moss 7005 (BM), Schlecter 11548 (BM); Maputo, Mendonca 2921 (BM); Barbosa, Mendonca 691 (BM). SUL DO SAVE: Inhambane, Peters s.n. (B).

A species distinguished by the reniform to deltoid, subcoriaceous leaves which are shiny above. The glabrous flowers are also worthy of note.

19. Cissampelos nigrescens Diels, in Engl. Pflanzen. 4(94):296. 1910. (Type: Warnecke 446!) (Figure 20).

Cissampelos nigrescens Diels var. cardiophylla Troupin, in Bull. Jard. Bot. Brux. 25:141. 1955 (Type: Schlieben 59136).

Twiners, stems striate, young stems glabrous to pilose. Leaves petiolate, peltate to 8 mm, reniform to broadly ovate or suborbicular, entire to undulate, the apex obtuse to rounded, rarely emarginate, mucronate, the base cordate to truncate, 2.5-6.5 cm long, 3.0-7.8 cm wide, membranous, palmately 5- to 12-nerved, puberulent to glabrous above, dark and shiny upon drying, paler below and pilose; petioles 1.8-6.0 cm long, pilose to tomentose. Staminate inflorescence multi-flowered fasciculate dichasia as cymose clusters from the leaf axils, diffuse; 1-3 dichasia per fascicle; peduncle of cymes at length 3 cm long, pilose; bracteoles linear to ovate, about 1 mm long. Staminate flowers yellowish-green; sepals 4, elliptic, 1.2 mm long, 1.0 mm wide, exteriorly puberulent; corolla patelliform, 1.0 mm in diameter, the exterior puberulent; synandrium about 0.5 mm high, anthers 4, glabrous. Pistillate inflorescence composed of 3-6 individual flowers fasciculate on bracteate racemiform secondary branches to 8 cm; bracts sessile or petiolate to 3 mm, suborbicular or reniform, entire, mucronate, 0.3-1.5 cm long, 0.3-1.8 cm wide, membranous, pilose. Pistillate flowers: sepal 1, obovate, 1.0 mm long and wide, exteriorly pilose; petal 1, reniform to suborbicular, 0.5-0.6 mm long, 0.5-1.0 mm wide, exteriorly pilose; carpel 1, gibbose, 0.5 mm long, tomentose. Drupe obovoid, 4 mm long, 3 mm wide, pilose; fruiting stalk 3 mm long.

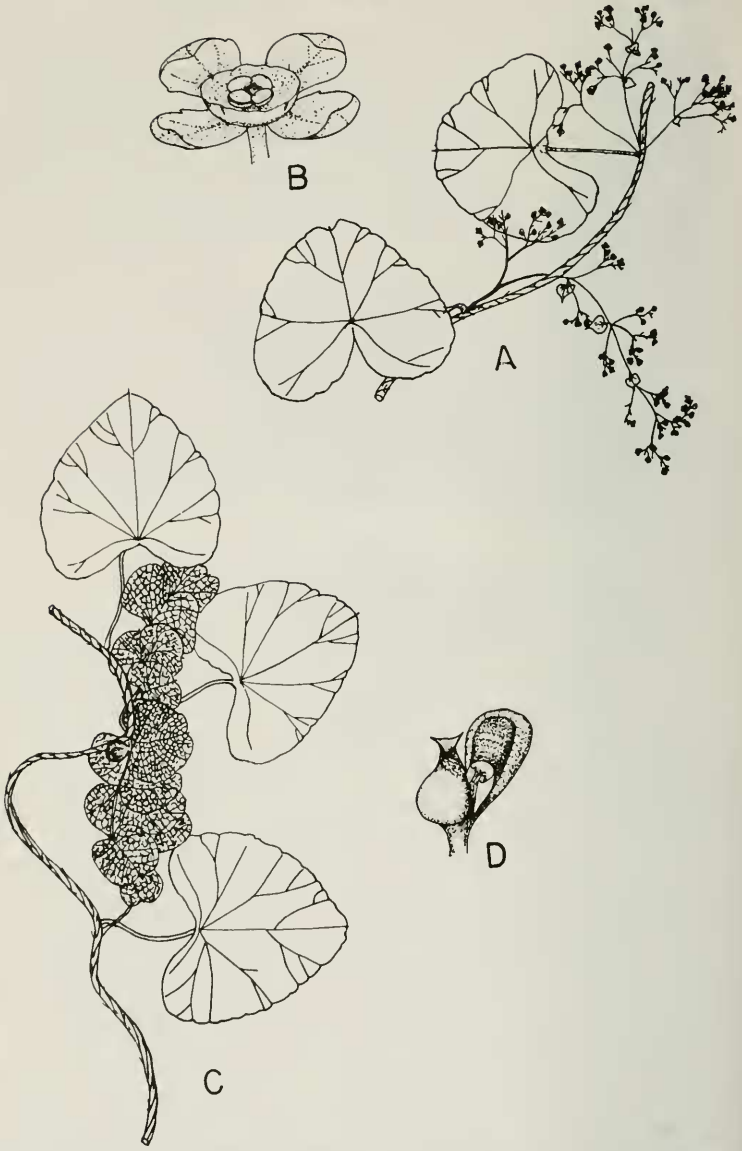


Figure 19. Cissampelos hirta Klotzsch. A: Staminate inflorescences and leaves, X 1/2; B: Staminate flower, X 15; C: Pistillate inflorescence and leaves, X 1/2; D: Pistillate flower, X 15.

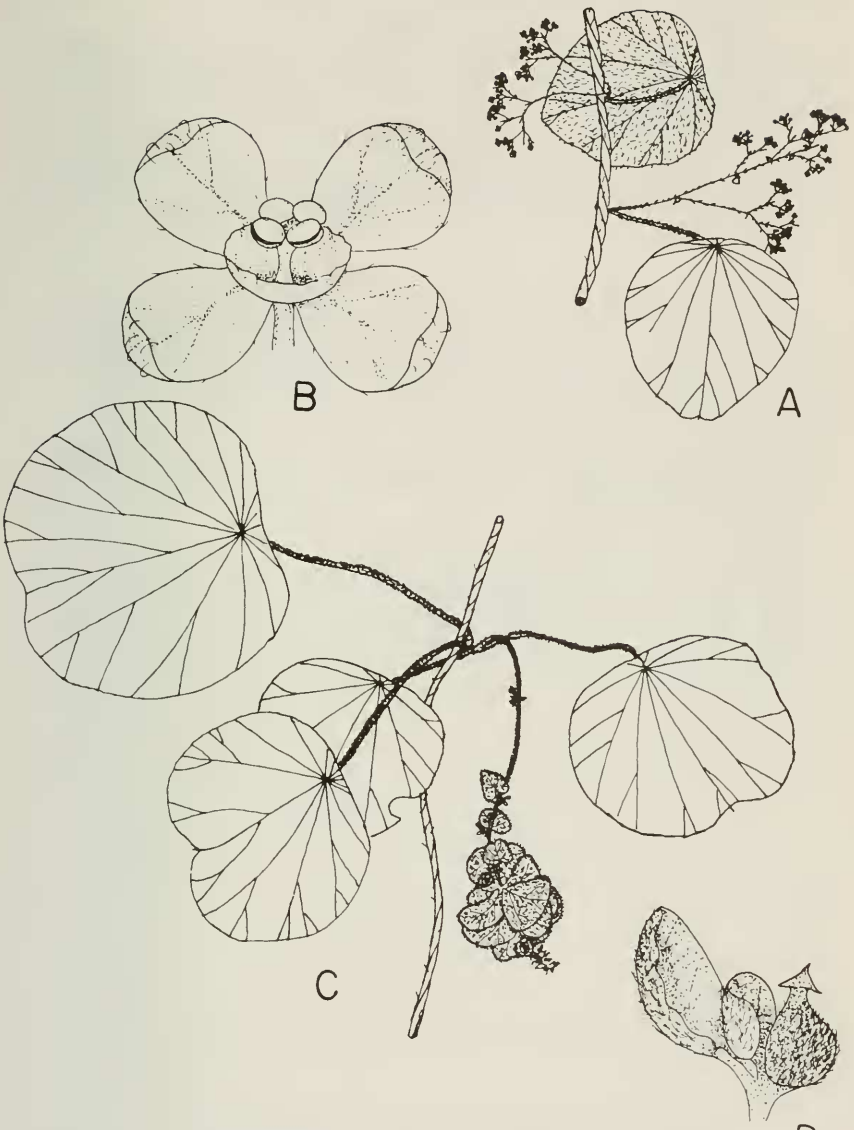


Figure 20. Cissampelos nigrescens Diels. A: Staminate inflorescences and leaves, X 1; B: Staminate flower, X 30; C: Pistillate inflorescence and leaves, X 1; D: Pistillate flower, X 30.

East Africa.

KENYA: RIFT VALLEY: Eastern Mau Forest Reserve, Geesteranus 6179 (GH,MO). CENTRAL: Muguga near Nairobi, Verdcourt 636 (MO).

MADAGASCAR: TULEAR: without precise locality, Humbert and Swingle 5641 (GH).

TANZANIA: Amani, Warnecke 446 (B); Mahenge, Schlieben 2060 (BM,S); Usambara Mts., Peter 17847 (B); Lindi, Busse 2438 (B).

A species which is close to Cissampelos pareira but differing in the darker and more shiny leaves, shorter pubescence, and smaller flowers.

Dubious Species

Diels (1910) based his description of Cissampelos pilgeri upon a single specimen (Pilger 255!) from Brazil. This collection is very similar to C. pareira from which Diels isolates primarily on the basis of an ebracteate staminate inflorescence. This character, however, is weak and not sufficient for species delimitation. Vegetatively the leaves are much like C. pareira but the staminate flowers of Pilger 255 are more pubescent than in the typical C. pareira. More material is required for an adequate judgment on this species.

Insufficient material was available for the study of Cissampelos madagascariensis (Baill.) Diels and C. perrierii Diels. The description of C. madagascariensis in the literature (Diels, 1910) reads as if the species should perhaps belong to the genus Cyclea while the C. perrierii description (Diels, 1920) has close affinity with C. pareira. The true nature of these species cannot be resolved until more material is collected.

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BOOK REVIEW

Alma L. Moldenke

"ELECTRON MICROSCOPY OF ENZYMES: Principles and Methods" Volume 3 edited by M. A. Hayat, xvi & 175 pp., illus., Van Nostrand Reinhold Company, Melbourne, London, Toronto, Cincinnati & New York, N. Y. 10001. 1975. $17.50.

The ten scientist-authors of the seven similarly organized papers sustain the scientific excellence of the earlier volumes and have provided a documented treatment of newer problems and viewpoints. All techniques have been critically pretested. Consequently and realistically the careful instructions for preparation and use of the various solutions, media and strains should enable electronmicroscopists and other kindred workers to prepare specimens satisfactorily.

This book covers the following topics: 1) the widely distributed non-specific esterases detectible by four ultracytochemical procedures, 2) purine nucleoside phosphorylase found in microbes, spores and many mammalian tissues, 3) cellulase which is a multienzyme complex whose components degrade cellulose to monosaccharides, 4) carbonic anhydrase which catalizes the hydration of CO_2 and the dehydration of bicarbonate ions, 5) a second preparatory method for detecting this same carbonic anhydrase so important in acid-base homeostasis, 6) creatine phosphokinase found in tissues with high energy requirement, and 7) acetyl CoA carboxylase which is involved as a coenzyme in many biosynthetic pathways utilizing ATP.

This editor and this publishing house have recently put forth an excellent series of E M books of which this one is an integral part. It is well illustrated and indexed.